

CropLife

SOUTH MARKETING EDITION

With Added Regional Circulation to the South Marketing Segment

A BUSINESSPAPER FOR THE FARM CHEMICAL MANUFACTURER, FORMULATOR AND DEALER

Published by The Miller Publishing Co., Minneapolis, Minn.

Vol. 7

Publication at Minneapolis, Minn.
Accepted as Controlled Circulation

MARCH 21, 1960

Subscription Rates:
\$5 for 1 year, \$9 for 2 years

No. 12

1959 Fertilizer, Pesticide Output Good; Outlook Bright

**Continued Activity
In Both Fields Seen
By USDC for '60**

WASHINGTON—According to an industry report in the recent issue of Chemical and Rubber, published by the U.S. Department of Commerce, the year 1959 was very favorable for production of fertilizer materials.

Output of anhydrous ammonia increased approximately 15%, the report says, compared with the preceding year. Various derivatives of ammonia also showed higher production levels—15% for ammonium nitrate, 20% for urea and 30% for nitrogen solutions. There was little change in ammonium sulfate production, however.

Phosphatic fertilizers were subjected to heavy demands in 1959, although the increase over 1958 was not quite as high as for nitrogenous materials. Production increases ranged from 5% for concentrated superphosphate and 10% for miscellaneous phosphatic materials to 13% for normal superphosphate. Deliveries of potash increased about 7%, indicating an even smaller uptrend in this demand for this fertilizer.

The outlook for the fertilizer industry in 1960 is for a continuation of the 1959 high rate of activity, and total consumption should not vary greatly from the banner year just passed. However, production of most materials will need to keep on the up-train to supply the same level of demand as developed in 1959, because inventory carryovers at the beginning of 1960 were in many cases probably not as high as a year ago.

Phosphoric acid shows signs of being considerably short of demand this (Turn to BRIGHT OUTLOOK, page 21)

Workshops in Eight States Promoting Early Detection of Insects as Pest Control Aid

WASHINGTON—A series of workshops on insect detection is being conducted by the U.S. Department of Agriculture, in cooperation with several states, to help plant protection workers improve their ability to recognize the presence of new insect pests before they gain a firm foothold in the U.S.

The 1½ day workshops are conducted by survey, detection and identification entomologists of USDA's

Agricultural Research Service and the various states. They began in January and will continue through March in Atlanta, Ga.; Baton Rouge, La.; Denver, Colo.; New York City; Omaha, Neb.; Lafayette, Ind.; Riverside, Cal.; and Walla Walla, Wash. Several hundred key workers in state and federal entomological agencies and in private organizations are expected to attend.

These workshops are the latest move in a stepped up federal-state effort, now in its second year, to detect the arrival of new insect pests from abroad or the spread of insects previously found in this country but confined to relatively small areas.

During 1959, the first year of the intensified cooperative program, reports of new insects were nearly triple those made in recent years. Ten new insects were reported for the first time in the U.S., and 73 were reported for the first time in individual states.

Among important pests reported in the U.S. for the first time last year were the pumpkin caterpillar, a common pest of cucurbits in Asia and Africa, found in Florida; the Cuban May beetle, a tropical wood-boring beetle, and an Asiatic rice aphid, all found in Florida; African thrips, found in California, and a European moth that is a potential stored-grain pest, found in Massachusetts.

Insects from abroad often thrive better and cause more damage in the U.S. than in their native habitats because of the absence of natural enemies, ARS entomologists say.

Goal of the workshops is to develop in all plant pest control workers not only a sharp awareness of differences in insect pests but also an ability to recognize unusual crop conditions or evidences of insect damage that betray the presence of a new pest. Early detection and prompt reporting are the keys to quick and relatively inexpensive eradication of an invading insect pest. In the past, foreign pests often have gained a firm foothold in an area and reached

(Turn to WORKSHOP, page 21)

AMMONIA INCREASE PREDICTED

MEMPHIS, TENN.—Ammonia supplies and storage facilities in the nation's major ammonia-using farm areas seem to have improved over a year ago, according to Jack F. Criswell, executive vice president of the Agricultural Ammonia Institute.

"It is well that they have," he added, "since late cold weather has held back field work in many areas and the demand for ammonia will come with a rush when it starts."

Both producers and distributors anticipate better ammonia volume than last year, Mr. Criswell said, and applicator sales have been brisk, defying a softening trend noted in some segments of the farm machinery market this spring. Mr. Criswell would not hazard a prediction on volume of ammonia for the fertilizer year which ends June 30, 1960, but pointed out that the 676,000-ton total for the year which ended June 30, 1959, was a 16% increase over the previous year as against a total fertilizer gain of 11.7%.

"It would seem safe to predict," he said, "that the ammonia volume gain will surpass the total fertilizer gain again this year. This is a continuation of the trend toward use of higher analysis fertilizers in general and to straight materials in particular."

Delaney Clause Criticized By Purdue Dean

**Dr. Earl Butz Says
Cranberry Action
Is 'Sensational'**

KANSAS CITY—The controversial Delaney clause of the food additives amendment and certain regulatory activities of the Food and Drug Administration were sharply criticized here by a former assistant secretary of agriculture, Dr. Earl Butz, dean of agriculture at Purdue University.

Dr. Butz, who spoke at the opening general session of the Grain and Feed Dealers National Association convention March 7, declared that the "zero tolerance" feature of the Delaney section of the law is inconsistent with generally accepted practice throughout nearly all phases of our way of living, and it grieves amendment.

"Sensational" Action

Referring to "sensational" regulatory action taken against cranberries and hormone-implanted chicken, Dr. Butz said, "Needless damage has been done to important agricultural enterprises, if not to the whole food industry. Millions of consumers have drawn the inference that some food producers and processors are 'kind of a culprit,' trying to pull a fast one on consumers."

"This attitude often reflects unfavorably on the whole food industry, when as a matter of fact, consumers should be eternally grateful for the tremendous job our food industry is doing in placing before them an adequate and varied supply of wholesome foods at ever-declining relative costs."

The speaker described how the "zero tolerance" requirements of the Delaney clause tend to thwart agricultural research and thereby threaten the basic strength of the entire economy.

"In our contemporary society, we (Turn to DELANEY CLAUSE, page 20)

Plea for More Efficiency on Farm Made by Speakers at Pennsylvania Lime Conference

UNIVERSITY PARK, PA.—The need for more efficiency on the farm and discussions of fertilizer products dominated much of the recent lime and fertilizer conference held recently at Pennsylvania State University here. Speakers representing colleges, the industry and the Tennessee Valley Authority were included on the program.

George Stanford of TVA reported on "oxamide," organic compound, as a possible source of nitrogen for fertilizer use, stating that it has been found available to plants as soluble nitrogen when ground to a —60

mesh. Although small-scale research on a synthetic process for producing oxamide has been started, "there is little cause for optimism in the near future," he said.

The TVA researcher added that as granules of oxamide increase in size, the use of nitrogen by plants decreases. However, with continued cropping, the residual nitrogen in larger particles tested showed much higher availability for oxamide than for a ureaformaldehyde preparation.

Mr. Stanford indicated that several compounds show a granule size-available

(Turn to CONFERENCE, page 20)

Ten Top Pests Listed by California

SACRAMENTO, CAL.—The federal government's public enemy ranking has a counterpart in agriculture. There is one important difference, however—agriculture's list includes only crop bandits.

William E. Warne, director of the California Department of Agriculture, in naming California's 10 most important crop pests, stated that the present list includes some newcomers which have replaced several species that were damaging to a single high-value crop of limited production.

The crop enemy list includes: Lygus bugs, corn earworms, mites, two-spotted spider mites, loopers, aphids, citrus red mites, peach twig borers, spotted alfalfa aphids and California red scale. New on the list are mites, aphids, peach twig borers and California red scale. The corn earworm held the number one pest rank since 1955, but was replaced by lygus bugs this year. The two-spotted spider mite moved from sixth to fourth place.

Mr. Warne stated the list was prepared by Ronald M. Hawthorne, economic entomologist in the department's Bureau of Entomology. It was compiled from records of the bureau; reports by county agricultural commissioners, the U.S. Forest Service, and the University of California, and information from pest control operators.

Damage and crop loss attributed to insect and mite pests in 1959 was estimated at \$138,165,894. The total includes control costs and is thus an over-all cost-loss estimate. Some animal pest losses, not previously reported, are also included. Assessable yield losses from lygus bugs, California's number one crop pest, totaled \$6,541,340, while California red scale, ranked tenth, caused losses estimated at \$1,380,066. Total losses caused by the top 10 were over \$43 million.

The annual listing, Mr. Warne said, is prepared for the U.S. Department of Agriculture Cooperative Economic Insect Report, and includes breakdown of crop losses caused by 112 mite and insect species, but does not include losses from minor pest groups.

CONTROL PLAN SOUGHT

MURKLE BEACH, S.C.—State, county and local health and city officials conferred here recently and discussed the possibility and expense of forming a sanitary and mosquito control district to include the coastal area from Briarcliff to the Georgetown County line at Garden City. The state agreed to make a survey of the area in question. An estimate is now being made to determine the cost of operating such a district.

WORLD PLANT CATALOG PLANNED

NEW HAVEN, CONN.—Preliminary work is underway at the Connecticut Agricultural Experiment Station on a machine-age way to catalog all of the known plants in the world.

Sydney W. Gould of Madison, amateur botanist with wide experience in machine tabulation of data, is now coding scientific names and other facts about the grasses. The study is being made under a grant from the National Science Foundation and is sponsored by the New York Botanical Garden and the Station, which is providing office space. Mr. Gould has been appointed a research associate by the station board of control. He is assisted by Miss Judith Hirsh, Clinton, and Dr. David J. Rogers of the Botanical Garden is an associate in the work.

In Mr. Gould's plan, each plant name is assigned a number that itself defines the position of the plant within a genus and family and also indicates in what broad division of the vegetable kingdom the name belongs.

These numbers, and related information in punched-card code, make possible machine tabulation of lists to show species within a genus, genera within a family, and other groupings useful to scientists, nurserymen, and others concerned with flowering plants, algae, fungi, bacteria or viruses. No complete listings now exist.

Penn-Olin Names New Officers

NEW YORK—James McWhirter has been named president and John O. Logan vice president of Penn-Olin Chemical Co. Mr. McWhirter is general manager of the Industrial Chemicals Division, Pennsalt Chemicals Corp., and Mr. Logan is a vice president of Olin Mathieson Chemical Corp.

Penn-Olin is a jointly owned subsidiary of Pennsalt and Olin Mathieson, formed to produce sodium chloride and other chlorate compounds at a plant at Calvert City, Ky., with an annual capacity of 25,000 tons.

Other Penn-Olin officers are C. L. Williamson, secretary, and W. Cooper Willits, treasurer. Mr. Williamson is executive assistant to the associate general manager of Olin Mathieson's Chemicals Division. Mr. Willits is treasurer of Pennsalt.

Four directors have been selected from each of the parent companies. Men named from Pennsalt are Mr. McWhirter, Mr. Willits, W. Alfred LaLande, Jr., and Albert H. Clem. Directors appointed from Olin Mathieson are Mr. Logan, Mr. Williamson, J. G. Johns and J. L. Wood.



DR. ERNEST MERCIER (left), director of the federal experimental farm at Lennoxville, Que., was honored by Quebec Fertilizers Inc. at its recent agronomic meeting for his contribution towards agriculture in Quebec, particularly his experimental work with raising beef cattle in the province. Dr. Mercier was presented with a leather brief case by Jean Leclerc, president of Quebec Fertilizers Inc. and chief chemist of the Montreal soil laboratory of Canadian Industries Ltd. Seated (left to right) are Edward Brisebois, assistant director of extension, Quebec Department of Agriculture; Andre Auger, director of field crops, Quebec Department of Agriculture, and Francis A. Raymeyer, field crop specialist, American Cyanamid Co.



H. B. Tatum

John A. Shamp

Robert D. Graf

Robert L. Hall

U.S. Phosphoric Adds to Technical Service Staff

TAMPA, FLA.—U.S. Phosphoric Products Division of Tennessee Corporation has announced the appointment of new personnel and staff changes in connection with the enlargement program in its technical services.

H. B. Tatum has been made director of technical service, located in Tampa. He has been associated with U.S. Phosphoric Products since 1936, serving in various departments including production, maintenance, engineering, research, development, sales, and technical service.

John A. Shamp, Kansas City, Mo., is a new technical service representative with an area consisting of Kansas, Missouri, Nebraska, Arkansas, Texas, and the southern portions of Iowa and Illinois. He has been with the company for the past 17 years, working in sales, customer service and technical service.

Robert D. Graf was recently relocated by the company in Minneapolis from Tampa. He has been with U.S. Phosphoric for the past eight years with responsibilities in research, development, production and technical service. He will work in the states of Minnesota, Wisconsin, North and South Dakota, and the northern portions of Iowa and Illinois.

A recent appointment to the U.S. Phosphoric technical service staff is Robert L. Hall who was formerly associated with the University of Illinois. His headquarters are in Richmond, Ind., and he will cover the states of Indiana, Ohio, Michigan and Kentucky.

Soil Tests on Increase, Extension Service Reports

LAMESA, TEXAS—The soil testing campaign started by the Texas agricultural extension service has increased soil tests from 300 to 400% over last year.

There might have been even more, according to Bill Bennett, soil chemist, if the weather had not been so cold. A survey made of South Plains counties show that Lamb County farmers had 500 soil tests made, while Hale County was second with 450.

Soil tests are a prelude to using fertilizer, the agricultural authorities of the area point out, so this means that more fertilizer will be used. Farmers will also be more likely to apply the kind and amount recommended by the soils laboratories.

Tolerance Granted

NEW YORK—The Food and Drug Administration has granted a residue tolerance for maleic hydrazide, or MH-30, in raw potatoes, potato chips and onions. The chemical, made by the Naugatuck Chemical division, U.S. Rubber Co., stops sprouting in stored potatoes and onions.

The FDA ruling, published in the March 11 issue of the Federal Register, granted MH-30 a residue tolerance of 15 parts per million in onions, 50 ppm in raw potatoes and 160 ppm in potato chips. The ruling means that FDA has approved the use of this chemical under the newly enacted food additives legislation, and onions and potatoes containing up to the stated residues of this chemical can be legally shipped across state lines.



H. B. Tatum

John A. Shamp

Robert D. Graf

Robert L. Hall

California to Consider New Pesticide Tolerance Regulations

SACRAMENTO, CAL.—The California Department of Agriculture will hold a public hearing in Sacramento April 20, to consider new regulations to establish tolerances and limits for pesticidal chemicals remaining in, or on, fruits, vegetables and hay sold within the state.

The 1959 session of the legislature amended the Agricultural Code to authorize the department to establish limitations on quantities of pesticidal chemicals remaining in produce.

The hearing, called by William E. Warne, state director of agriculture, will be held in the assembly room of the California Department of Agriculture, 1220 N St., Sacramento, beginning at 10 a.m. All persons interested in the proposals are invited to attend the hearing.

Section 1011 of the Agricultural Code of California provides that produce carrying spray residue may not be sold if the residue is in excess of permissible tolerances. Mr. Warne said the adoption of tolerances would be another step toward assuring the continued marketing of wholesome produce to consumers.

R. Z. Rollins, chief of the department's Bureau of Chemistry, said that as far as possible, the proposed regulations would establish tolerances identical with those enforced by the Federal Food, Drug and Cosmetic Act for produce in interstate commerce. He added that, for many years, fruits and vegetables have been sampled and analyzed by the California Department of Agriculture to detect common pesticidal chemical residues, but with development of many new pesticidal chemicals it now is necessary for each to be given specific consideration by the department.

"In the interest of uniformity," said Mr. Warne, "it is appropriate that California's regulations should be the same as those of the federal government. They protect California consumers to the same degree as citizens across the nation using produce shipped interstate. Through this uniformity, California produce which meets our own state requirements will pass spray residue inspection by the Federal Food and Drug Administration elsewhere."

An important proposed revision to be discussed at the Sacramento hearing is the adoption of a zero tolerance for all pesticidal chemicals in or on produce, except where a greater tolerance is specifically provided by the state or federal governments. Bureau of Chemistry officials said that adoption of the zero limit of pesticide residue may require substantial modification of former pest control practices to avoid over-application of pesticides to crops, and to avoid contamination of adjacent crops with drifting pesticidal chemicals.

DIES AT SEA

LOS ANGELES—Thomas S. Reynolds, 81, co-founder of the Bandini Fertilizer Co. of Los Angeles, died at sea recently while returning from a vacation cruise to the Hawaiian Islands. Mr. Reynolds and his son, Byron, founded the fertilizer company in 1927. At the time of his death, Mr. Reynolds was secretary-treasurer of the company.

Economic Considerations Noted In Survey of Liquid Fertilizer

By Roger C. Woodworth and Wesley G. Smith*

TH E USE OF LIQUID mixed fertilizer is a relatively new development in agriculture. Major attention is still centered on the technical problems of manufacture and distribution. Yet it is not too early to look at the economics of liquid mixed fertilizer from the farmer's standpoint.

This article will deal with the use and possibility of expanded use of liquid mixed fertilizer by farmers in the Southeast. A realistic appraisal of the economic possibilities of liquid mixed fertilizer must be made in the context of a changing agriculture and a changing technology for the manufacture and distribution of dry and liquid forms of fertilizer.

Bulk spreading of dry and use of liquid fertilizers is likely to increase substantially in the years ahead for the following reasons:

1. Per acre fertilizer rates have been increasing and likely will continue to increase.
2. The cost of farm labor has increased and will continue to increase relative to most other farm inputs.
3. Higher costs and lower profit margins are forcing farmers to become more efficient in their production.
4. Farm units are getting larger.
5. Farmers have been and will continue to substitute capital for labor and land.
6. Many farmers are willing to pay something if necessary to eliminate lifting and tedious tasks. This is particularly true since application costs are small relative to total fertilization costs.
7. Because of the above factors, farmers are likely to pay more attention to improved timeliness of operations and means by which the size of work crew can be reduced.
8. The process of bulk spreading of dry and liquid fertilizer is likely to improve through technological advance.

The potential for liquid mixed fertilizers therefore, will depend on an increasing extent on the competitive position with bulk spreading of dry fertilizer. Also, the use of liquid nitrogen and/or anhydrous ammonia will likely increase because of the lower unit costs and reduction in labor required.

Investment and Fixed Costs

For some systems, particularly where a wide boom is involved, liquid application equipment tends to cost more than dry equipment. Table 1

*Associate agricultural economist, University of Georgia, and agricultural economist, Tennessee Valley Authority, respectively. Paper presented at Southern Regional Liquid Fertilizer Conference, Eatonton, Ga., Feb. 9-11.

Table 1.—Investment, Fixed Cost Per Year and Per Acre for Specific Types of Dry and Liquid Fertilizer

Equipment	Typical investment dollars	Annual fixed cost (dollars)	Fixed costs per acre for the following number of acres fertilized						
			25	75	125	175	225	325	475
Dry Fertilizer Equipment									
Planter attachment									
2 Row	130.00	16.34	.45	.22	.13	.09	.07	.05	.03
4 Row	268.00	32.42	1.30	.43	.24	.19	.14	.10	.07
Broadcast distributor									
8 Ft.	290.00	36.44	1.46	.49	.29	.21	.16	.11	.08
16 Ft.	325.00	40.85	1.63	.54	.33	.23	.18	.13	.09
2-Row applicator*	125.00	15.71	.63	.21	.13	.09	.07	.05	.03
Planter attachment									
2 Row	160.00	20.11	.88	.27	.16	.11	.07	.05	.04
4 Row	270.00	33.93	1.38	.45	.27	.19	.15	.11	.07
Boom applicator									
14 ft., steel tank	450.00	56.55	2.26	.75	.45	.32	.25	.18	.12
14 ft., aluminum tank....	600.00	75.40	3.02	1.01	.40	.41	.31	.23	.16
20 ft., steel tank	650.00	81.60	2.26	1.09	.65	.47	.35	.25	.17
20 ft., aluminum tank....	800.00	100.53	4.02	1.34	.80	.57	.44	.31	.21

*Homemade—See Georgia Agr. Exp. Stations Mimeo N.S. 35.

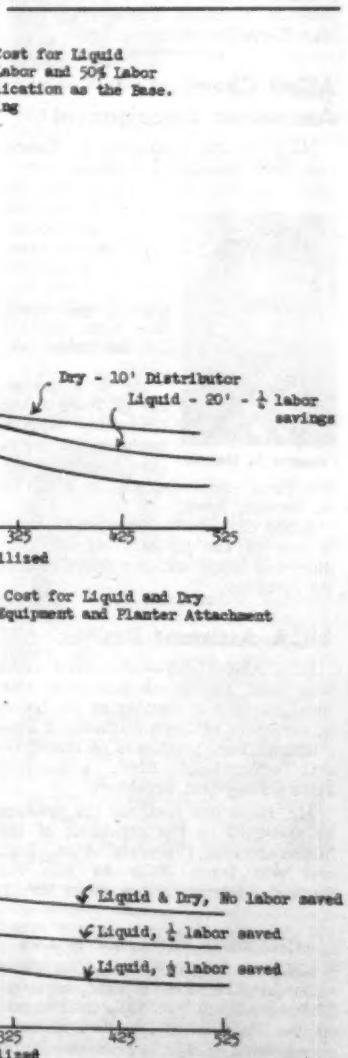
Sulphur Institute Appoints Agronomist

WASHINGTON—The Sulphur Institute, a newly-formed research organization, has announced the appointment of Dr. Samuel L. Tisdale as its chief agronomist. Dr. Tisdale presently is southeastern regional director for the National Plant Food Institute, and will leave that organization on May 1 to assume his new position. Dr. S. L. Tisdale

The announcement was made by Dr. Russell Coleman, Sulphur Institute president.

Dr. Tisdale will be in charge of the institute's program of research and education in connection with the use of sulphur for agricultural purposes. Sulphur, as a plant nutrient and component of fertilizer, is required in large quantities for profitable crop production. In the form of sulphuric acid, it is a basic material for the production of superphosphates, also used for fertilizer purposes. Other agricultural uses for sulphur and certain sulphur compounds are for insecticides and for the reclamation of saline and alkali soils, particularly in the Far West.

Before joining NPFI in 1957, Dr. Tisdale was professor of soils at North Carolina State College and director of the soil testing division of the North Carolina Department of Agriculture. A native of Florida, he received his bachelor of science degree from Alabama Polytechnic Institute in 1942 and his doctorate from Purdue University in 1949. His doctoral thesis was on the subject of sulphur nutrition in plants. He then joined the agronomy staff at North Carolina State College as assistant professor, became associate professor in 1953, and professor of soils in 1955.





Dr. E. M. Meixner

Ben J. Titus

APPOINTMENTS — Dr. Edward M. Meixner, owner of Farm Crop Soil Service, Ft. Recovery, Ohio, has been appointed distributor and Ben J. Titus, Carmel, Ind., representative for Schein Brothers, Inc. Dr. Meixner will distribute the company's nitrogen solutions and liquid mixed fertilizer equipment in Ohio and part of Indiana. Mr. Titus, formerly with Dos-Gro Corp., the U.S. Liquid Corp. and Ayleco Fertilizer Corp., will cover Indiana, Michigan and Kentucky.

Atlas Powder Elects Two New Directors

WILMINGTON, DEL.—Atlas Powder Co. announced the election of Max E. Colson and Edward J. Massaglia to its board of directors.

Mr. Colson, a native of Joplin, Mo., is a vice president of Atlas and general manager of its explosives division. He joined the company in 1935, following graduation from the University of Kansas with a B.S. degree in chemical engineering, and has held increasingly responsible positions in the company's explosives division.

Mr. Massaglia, a native of New York City, is a vice president of Atlas and general manager of its chemicals division. He joined the company in 1955, having formerly been with Pfizer International, Inc., Chas. Pfizer & Co., Niagara Alkali Co. and Benzol Products Co. Mr. Massaglia holds a bachelor's degree and a master's degree in chemical engineering from New York University.

Allied Chemical Announces Appointment

NEW YORK—Eugene L. Heintz has been appointed a sales representative for Allied Chemical's Nitrogen Division.

A former county extension director in Muscatine County, Iowa, Mr. Heintz will cover the west central Illinois sales territory.

He is a graduate of Iowa State University with a bachelor of science degree in agricultural education, and is a native of Nevada, Iowa.

Allied Chemical's Nitrogen Division is one of the nation's largest producers of liquid and dry mixed chemical fertilizer.

MCA Assistant Resigns

LOS ANGELES—Cleveland Lane has been appointed executive vice president and a member of the board of directors of John Sutherland Productions, Inc., producers of industrial and educational films, announced John Sutherland, president.

Mr. Lane has resigned his position as assistant to the president of the Manufacturing Chemists' Assn., Inc., and will leave MCA to join the Sutherland organization about May 1.

ARKANSAS JANUARY SALES

LITTLE ROCK, ARK.—Fertilizer sales in Arkansas during January, 1960, amounted to 9,421 tons, reported the State Plant Board. This compared with 8,769 tons sold during January, 1959.

New Weevil Control Methods Urged by USDA

WASHINGTON—New methods for controlling boll weevils and weed pests of cotton are a major requirement of Southern farmers, according to the U.S. Department of Agriculture's Cotton and Cottonseed Research and Marketing Advisory Committee, which held its annual meeting in Washington recently. The boll weevil is perhaps the most important obstacle to efficient cotton production throughout much of the Cotton Belt.

Basic and applied research on all phases of the boll-weevil problem should be strengthened, the committee advised. Members suggested a team approach among plant breeders, geneticists, physiologists, chemists, soil scientists, engineers, economists, and entomologists.

The committee also advised expanding studies to improve control of important weeds affecting the cotton crop. Weeds are estimated to cause

annual losses equal to about 17% of the total value of the cotton crop (or about \$440 million), the committee pointed out. Development of plants with resistance to insects and diseases and with seed low in gossypol content should be emphasized in cotton breeding, the committee said.

Dr. C. C. Murray, dean and coordinator of the college of agriculture, University of Georgia, Athens, was reelected committee chairman, and J. D. Fleming, executive vice president of the National Cottonseed Products Assn., Memphis Tenn., was elected vice chairman.

Other committee members are:

Harry S. Baker, president of Producers Cotton Oil Co. and outgoing vice chairman of the advisory committee, Fresno, Cal.; George C. Cortright, owner of the George Cortright Co., Rolling Fork, Miss.; Otto Goedecke, president of Otto Goedecke, Inc., cotton merchants, Hallettsville, Texas; J. D. Hays, Hays Land Farms, Huntsville, Ala.; A. L. Hazleton, man-

ager of Producers Cooperative Oil Mill, Oklahoma City, Okla.

Also, J. Russell Kennedy, executive vice president of Caicot Ltd., Bakersfield, Cal., cotton cooperative; Aubrey L. Lockett, president of the Lockett Seed Co., Vernon, Texas; W. Gordon McCabe, Jr., vice president in charge of merchandise for the J. C. Penney Co., New York; H. M. Rickman, cotton producer, La Mesa, N.M.; Wilmer Smith, cotton producer, Wilson, Texas; John H. Todd, executive vice president of the National Cotton Compress & Cotton Warehouse Assn., Memphis; and C. H. Williams, president of the Swift Manufacturing Co., Columbus, Ga.

ANNUAL FERTILIZER SALES

MADISON, WIS.—Fertilizer sales in Wisconsin during 1959 totaled 459,645 tons, or a decrease of 3.1% from 1958, reported W. B. Griem, Wisconsin Department of Agriculture.

"Red" Emm shows you...

HOW MONSANTO
WEED KILLERS
BUILD STORE TRAFFIC
...HELP YOU SELL!



New "Red" Emm SUPER-6 CONCENTRATES! Brush Blitz, Crop-Guard Weed Killer, Brush-O-Cide, and Field Clean Weed Killer... a new line of 6-lb. formulations that give your customers more "kill" at a lower cost... two cans do the work of three! These SUPER-6's spray 50% more acreage than ordinary 4-lb. formulations.

Veteran Entomologist Announces Retirement

ST. PAUL, MINN.—Prof. C. E. Mickel, head of the department of entomology and economic zoology at the University of Minnesota since 1944, will retire in June.

He has been a noted researcher on insect control, teacher of general entomology, insect taxonomist and is a one-time extension entomologist. He played a major role in setting up the university's "insect library," a collection of 2½ million bugs used to identify insects involved in research and control programs.

Shell Division Moves

NEW YORK—The agricultural chemicals division of Shell Chemical Co. has moved to 110 W. 51st St., New York 20, announced S. H. McAllister, general manager.

The firm's new phone number will be JUDSON 6-5060, Mr. McAllister said.

IDENTIFICATION REQUIRED

SACRAMENTO, CAL.—Amendments to California Department of Agriculture regulations propose that "for hire" pest control operators keep their ground rigs and nurse rigs "conspicuously marked with the name and address of the operator and the deliverable capacity of the tank or hopper."

This amendment was recommended by county agricultural commissioners to assist them in checking on the operations of firms engaged in treating home plantings and similar door-to-door agricultural pest control.

It is also proposed that regulations be changed to emphasize that agricultural pest control operators follow standard practices in accordance with the recommendations of the manufacturer or registrant of the economic poison.

Delavan Elects New Vice President

WEST DES MOINES, IOWA—At the directors meeting held Feb. 24, the Delavan Manufacturing Co. of West Des Moines elected J. David Hopkins to the office of vice president in charge of sales. Mr. Hopkins, who has been with Delavan since January 1959 as general sales manager, holds a bachelor of engineering degree from Yale University and a master's degree in business administration from Harvard. Prior to joining Delavan, Mr. Hopkins was southwest regional manager for General Electric Co.

Delavan designs and manufactures fuel injectors and spray nozzles.



J. David Hopkins



OFFICER INSTALLED—The Professional Horticultural Spraymen's Assn. of Broward County, Fla., elected and installed officers at its annual meeting at Ft. Lauderdale, Feb. 20. Lee Horning, president, displays new gavel presented to him at first annual officer installation banquet of the organization. Sid Kirkpatrick, Kirk's Palm Nursery, master of ceremonies of the evening, is at left, and Mrs. Horning at right. Other officers named by the group were F. E. Benson, vice president, and Hough Sherrone, secretary-treasurer, both of Ft. Lauderdale.

Highway Equipment Names Division Manager

CEDAR RAPIDS, IOWA—Appointment of Clayton M. Porter as division manager for Highway Equipment Co., Cedar Rapids, was announced by Gale E. Allen, general sales manager. Mr. Porter will cover the states of Indiana, Ohio, Kentucky, Michigan, West Virginia, Virginia, Western Pennsylvania and Garrett and Allegheny counties in Maryland.

Highway Equipment Co. manufactures "New Leader" Lime and Fertilizer Spreaders and Blenders. Mr. Porter has been a machinist, traveling service representative, sales manager and district sales representative for various companies in the construction and machinery fields.

Dorvan C. Rolston Appointed Salesman

LOS ANGELES—Dorvan C. Rolston has been appointed sales representative in the marketing department of U.S. Borax & Chemical Corp., it is announced by L. Ralph Boynton, director of field sales operations.

Mr. Rolston, formerly associated with the nitrogen division of Armour Agricultural Chemical Co. and the inorganic chemicals division of Monsanto Chemical Co., will represent U.S. Borax in Iowa, Minnesota, North Dakota, South Dakota and Wisconsin.

Working under supervision of the U.S. Borax Chicago regional office, Mr. Rolston will be used in Mason City, Iowa.

Here's a free double-barreled direct mail program that really brings the customers in...a tried and proven traffic builder...just stock 100 gallons of any combination of Monsanto weed and brush killers. Monsanto will send out two mailings to 100 of your top customers. The first mailing invites them to come into your store...the second mailing offers them a \$1.00 pack of farm utility needles absolutely free! You get 200 mailings and 100 of these useful needle packs at no charge.



Grassy-Weed Killers! Randox® and Vegadex®—new spray-as-you-plant weed killers—knock out grassy weeds in corn, soybeans, and vegetables. Exclusive products for higher dealer profits.

Easy-to-use containers that "sell" and "sell"! These new 5-gallon spout-top cans almost sell themselves. Each can is tagged with complete "how-to-spray" instructions written in plain language.

Monsanto advertising sells and re-sells your customers! Your customers will see "Red" Emm products advertised in Farm Journal, Progressive Farmer, Farm Quarterly and many state farm papers.

Lifelike display of "Red" Emm solves weed problems! Giant display with "dial-the-crop" selector answers customers' questions for you tells just what weed killer to use.



Learn how Monsanto can help you sell more in 1960. Mail this coupon right now (while you are thinking about it) and get all the money-making facts.

Monsanto Chemical Company, Organic Chemicals Division
Agricultural Chemicals Department, St. Louis 66, Missouri

Sounds good! Please send me more information regarding the new Monsanto Weed and Brush Killer line.

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FIRM.....

ADDRESS.....

CITY or COUNTY..... STATE.....



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EXCLUSIVE SALES AGENTS

ASHCRAFT-WILKINSON CO.

Research Findings Meaningless If Farmers Stay Unsold on Use

By Werner L. Nelson and J. Fielding Reed*

American Potash Institute

PUTTING INTO ACTION the results of research has always constituted a challenging problem to American agriculture. In some parts of the world, this is much easier to accomplish than in others. In some areas, farmers almost read the results over the scientist's shoulder and go right out and try them. At the other extreme, there are those farmers who are very slow to change old practices and to whom a new practice resulting from research must be sold.

The use of diagnostic tools has always captured the attention of the farmer and intrigued him. There is a magic flavor associated with chemical probing into his particular soil or plants. Thus, such tests constitute an excellent channel for putting research into action. They are the links between the research scientist and the practical farmer.

If these diagnostic aids were just gimmicks or eye catchers, they might be of doubtful value, but, fortunately, they are much more than that today. The accumulated research behind the use of the diagnostic approach is enormous, so that very useful and well-founded tests have been developed. This is certainly one of the best accepted means of putting research into action.

Farming today is a highly competitive business. The successful farmer must strive for the greatest efficiency possible. The research worker tries to supply him with the best technical assistance he can provide. Diagnostic tests are generally readily available and easily usable. Certainly, they are only one of the many channels for translating research into action, but they are a well-accepted means.

Excellent research programs show

*From paper presented before recent American Society of Agronomy meeting.

the importance of plant nutrition in efficient farming. Yet farmers seem prone to put other practices ahead of adequate fertilization in their striving for efficiency. This might be illustrated by the case of the farmer who buys a shiny new tractor while his plants are showing obvious signs of plant food deficiency. He has been well sold on one practice, while another lags.

Leaders in efficient farm production today are following all practices shown by research programs to be good. They realize that they can't afford just to pick one practice and let the others go. The diagnostic approach offers a means of selling the whole package. This is illustrated in the following list of well-accepted practices suggested by leaders:

1. Study growing plants—diagnostic approach
2. Best variety or hybrid known
3. Heavy final stand
4. Heavy plant nutrient use
5. Plow-down applications
6. Row applications
7. Pest control

Now, the great feature of this diagnostic approach is that it opens the door to putting across these other desirable practices. So it can be the channel for putting not only plant nutrient research into action, but many other excellent research-proven practices.

Soil Testing

One of our most widely accepted diagnostic aids today is soil testing. Soil testing now enjoys very wide acceptance. Of course, we are constantly striving to improve soil testing, and as we examine our objectives in soil testing research, it might be well to consider an important viewpoint whether there is a way to determine the absolute nutrient requirements of

a plant or whether such information would be meaningful if it were obtained. An ideal nutritional environment indeed may be one in which all nutrient elements are available to the point of slight luxury consumption at all times. (Agron. Jour. 49:618-1957)

In this diagnostic approach, the key man is the extension leader. He often does not become really enthusiastic about proper plant nutrition nor does he take advantage of the latest soils research until he has a part in these programs. As he becomes a key part of soil and plant testing, he becomes acquainted with the results of research, and the result is a vigorous action man.

Next, the farmer himself becomes a diagnostic approach fan and is in a position to be educated to the latest research findings as well as the earliest fundamentals of plant and soil science. By having a part in soil testing, the farmer can receive the benefits of the very latest in research findings in his program, yet he doesn't need to do the research or even understand the techniques. Here he is taking an inventory of one of his resources. He usually knows how many cattle, hogs, and farm machines he has, but often knows little of his soil inventory.

Soil test recommendations are in even better position to pass on the latest research information if two or three levels of recommendation are used in order to have something for the best farmer. As he has pushed his knowledge frontiers ahead, he is inclined to find the average recommendations too conservative.

Recently, soil test summaries have been prepared in many states. The soil test summary offers an interesting way of presenting research findings on soil resources to the farmer. However, to drive these facts home often requires a breakdown to a more local or county level.

Plant Tests

Diagnosis, of course, goes beyond soil investigations and includes many other tests and observations. One of these considers the plant itself. As a catch-phrase, we use the term "give your plants a blood test"—a rather corny but effective analogy. The plant integrates the many factors in the environment, and plant tests measure the nutrients actually absorbed by the plant. In-the-field testing of plant tissues has been simplified so that no complex equipment or solutions are needed to get a rapid look at the nutrient status of the plant. The tests for N, P, and K can be performed in the field.

There is some question as to whether, at the present stage of development, this is a service tool or a research tool. Actually, it takes appreciable experience to be able to make these tissue tests and to interpret them properly. This diagnostic aid probably lies between the research and the service zone. It requires research appreciation to interpret properly, but this is being developed in the leaders out on the firing lane.

The team approach is being used more and more in translating research into action. A team of four—the farmer, the county agent, the extension specialist, and the industry agronomists may work through the diagnostic approach. Deficiency symptoms are confirmed with tis-

sue tests. This is a start in developing confidence in the test.

Once confidence in the diagnostic tool is acquired, its usefulness can be extended. Deficiency symptoms are encountered less and less today. The better farms do not have obvious deficiency symptoms, yet they are not producing at the level of maximum profit. The term "Hidden Hunger" has been coined to describe this situation. Use of the diagnostic approach, through both soil and plant testing, offers a means of inventory of the soil resources and the plant nutrient level. "Hidden Hunger" is avoided, and plant nutrients are eliminated as a limiting factor.

Such tests convince the farmer that his agricultural leadership is an "action" group and not just a "talking" group. He responds to a county agent who brings his kit out and actually makes a test on his farm. The agricultural leader who assists him in taking his first soil sample is doing him a real service. It is certainly debatable whether a county agent should perform soil tests himself in the field, or whether he should send in material to a well-equipped laboratory. But sometimes tests in the field will tell him something that sending in a sample would miss. Regardless of which step the local leader follows, his use of the diagnostic approach increases his interest in the results of research.

Other Diagnoses

When a physician uses the diagnostic approach, he does not confine himself to chemical tests but explores all possibilities, asking questions, looking, listening, and physically testing. This is also essential in our field. It should always be made clear to the farmer that his soil problem can be other than plant nutrition.

Thus, one of the functions of the diagnostic approach, and one of its problems, is to diagnose troubles due to factors other than plant nutrition. The agronomist or soil scientist can stop with plant nutrient or soil diagnoses. He simply says, "It must be some disease or insect." Or he can smother the issue with a profound, though confusing, statement such as, "trouble due to a gross imbalance of the heavy metal cations."

To be most helpful, he should attempt to go further and look into soil factors other than simple nutrition that may be responsible for trouble.

The local county agent or advisor must usually go even beyond this and consider factors other than the soil or plant nutrition. And all who are aiding with the diagnostic approach should make an effort to broaden their knowledge and use this approach to put into action research findings associated with many fields.

Any of various limiting factors must be recognized, such as insect damage, weed problems, 2,4-D damage, diseases, or water shortage. Many factors may hold down yields. All have to be considered in the diagnosis.

Research

We have to improve our techniques and our approach. Some farmers change slowly and only partially. There are still many problems that offer a challenge for the future of the diagnostic approach. Research will point the way.

Many of our field calibration studies are already out of date because they were conducted where there were limiting factors such as stand, insect damage, inadequate variety, improper placement, etc. It is difficult to predict what management practices farmers will be using 10 years from now. It would seem essential to conduct field calibration studies with management practices 10 years ahead of our time. This will ensure that we will be ready with answers when the grower demands them.

A central Indiana farmer has an



MEMBERS of the recently organized Kansas Plant Food Council are pictured above at a meeting, Feb. 1, at Manhattan. Seated, (left to right) Tom Hruza, Allied Chemical Corp.; Dr. Floyd Smith, Kansas State University; A. H. Stephenson, Consumers Cooperative, chairman; Robert M. Easley, Olin Mathison Chemical Corp., secretary, and Arlan D. Woltemath, National Plant Food Institute. Standing, (left to right) R. V. Olson and E. A. Cleavinger, Kansas State University; Robert Guntert, Kansas State Board of Agriculture; George Wickstrom, American Potash Institute; D. E. McHard, Kaw Fertilizer Service; F. L. Douthit, Davison Chemical Co., and Dr. Robert Bohannon, Kansas State University. The council is an informal organization, "acting entirely in an advisory capacity." Its purposes are: 1. To encourage fertilizer research and aid in publicizing findings of this research; 2. To promote educational programs in the proper use of fertilizer; 3. To work with the Kansas State Board of Agriculture for a better understanding of the Kansas fertilizer laws, and in matters pertaining to fertilizers in Kansas; and 4. To promote the exchange of viewpoints of the membership on problems relating to plant food and its use.

8-year average of 190 bushels in the Indiana Five-Acre Corn Contest. He applied very high rates of N, P.O., and K.O. According to present day standards, his soil tests extremely high in P and K. However, what does it take for such a long-time average yield?

Research on soil and plant chemistry for both major and minor elements must continue if diagnostic techniques are to continue to improve. Up to now, the Land Grant Colleges and USDA have been doing the research. The question might be raised as to who will be doing the research for the private laboratories and consulting firms in the future. If the research is to be continued by official agencies, more help should be given by industry either by direct grants or by aid in obtaining appropriations. Will the agricultural producer be sufficiently convinced of the value of the service to pay for not only the technological performance of the test and its interpretation, but also for the research behind the soil test?

The diagnostic approach today is a great channel for putting research into action. Its future is even brighter. Such techniques offer the extension agronomist and farm advisor an opportunity for speeding up the rate at which research findings are translated into use. This research can involve many items other than just those related to the diagnosis itself.

Serious Legume Diseases Spotted in Minnesota

ST. PAUL, MINN.—More than a dozen plant diseases are doing major damage in alfalfa, red clover and sweet clover fields in Minnesota.

Plant pathologists B. L. Renfro and R. D. Wilcoxson at the University of Minnesota, and F. L. Froehner, U.S. Department of Agriculture, report findings from disease surveys conducted around the state since 1956.

In alfalfa, the most serious diseases were spring blackstem or leaf spot, *Pseudoplea* leaf spot (also called brown spot, or scorch), common leaf spot, bacterial wilt and root and crown rot.

Of these diseases, *Pseudoplea* leaf spot was the only new one to appear in the past four years. First epidemic was in 1956, on second and third hay cuttings. In 1959, the disease in many parts of the state was also severe on first hay crops, where stands were 2 years old or older.

In red clover, major diseases were blackstem and leaf spot, northern anthracnose, virus disease, root rots, leaf spot and target spot.

Summer blackstem, blackstem that attacks throughout the season and common leaf spot were major diseases in sweet clover fields.

The plant pathologists also examined a few fields of other legumes. Except for northern anthracnose, the same diseases found in red clover were also present in white and alsike clover. Two diseases caused light infections in birdfoot trefoil.

Sales Gain Reported

NEW YORK—The annual report of St. Regis Paper Co. and consolidated subsidiaries for the year ended Dec. 31, 1959, shows large gains in sales and earnings, establishing new records. Higher rates of production were recorded in practically every division.

Net sales for last year at \$474,393,134, compared with \$408,626,275 in 1958. Net income for 1959 at \$28,615,519, was equal, after preferred dividends, to \$3.01 per share of common stock, on 9,363,515 shares. This compared with \$21,998,072, equal, after preferred dividends, to \$2.41 on 8,941,118 shares in 1958. Of the \$65,766,859 increase in sales, approximately 79% resulted from a strong improvement in business throughout the company. The balance represented the net sales of companies acquired in 1959 from the dates of their acquisitions.

Aquatic Weed Control Organization Planned

CHICAGO — Thirty-one aquatic weed control operators from six North Central states—Minnesota, Wisconsin, Michigan, Illinois, Indiana and Ohio—met with conservation officials and state research personnel of the area March 1, in the first annual conference sponsored by Chipman Chemical Co. to formulate plans for an organization to further the interests of the operators in the field of aquatic weed control.

Speakers from the various states represented pointed out the need for an organization of the type proposed, since aquatic weed control is becoming more specialized and the need for closer cooperation between research workers and operators is apparent.

Dr. B. Domogalla, operator from Butler, Wis., and Dr. Frank F. Hoop-

er, chief biologist, Michigan Conservation Department presented their views and a panel composed of conservationists, biologists, and fish and game experts from the six states discussed state regulations having to do with aquatic weed control.

Kenneth Mackenthun, Wisconsin state biologist, was named temporary chairman to preside over a representative committee elected to present detailed plans for the organization at the next called conference. Selected to serve on the organization committee were the following: Dave Papier, fisheries biologist for Ohio; Woodrow Fleming, biologist and operator, Columbus, Ind.; Boyd Lindberg, operator from Illinois; Jim Smith, landscape architect, Detroit; Ed Longton, biologist-operator from Minneapolis, Minn.; Dr. F. F. Hooper; Paul Eller, Chipman Chemical Co., and Harold Jones, American Smelting and Refining Co., Memphis, Tenn.

TO BUILD INSECT CONTROL CENTER

TIFTON, GA.—Preliminary drawings for a new grain insect control building at the Georgia Coastal Plain Experiment Station in Tifton have been completed, according to Dr. Frank P. King, director of the station.

Dr. King said he understands that the contract for the building will be let by July 1. He said it would be placed on Davis Road facing Abraham Baldwin Agricultural College. He said grain insect research would be carried on from the green to the dried stage here.

The \$300,000 project will be constructed by the federal government and will include offices, laboratories, equipment sheds and two greenhouses.



WIDELY RECOMMENDED Heptachlor is widely recommended as a soil insecticide, because of its effectiveness and economy. The U.S.D.A. has issued specific directions allowing the continued use of Heptachlor on the following food and feed crops: corn, cotton, certain fruits, berries, and vegetables, small grains, grass, pasture and range. Heptachlor can also be used on tobacco.

BIG DEMAND Recent improvements in application equipment make it easier for the average farmer to apply Heptachlor. More and more farmers are using Heptachlor, because it gives them better results at no extra cost. This is the year that all the groundwork will pay off! Greater acceptance, easier application, and doubled advertising and sales promotion mean a big demand for Heptachlor!

GET SET TO SELL MORE

HEPTACHLOR

MAIL COUPON TODAY FOR
LATEST INFORMATION! →

EXPANDED ADVERTISING Look for big Heptachlor promotions this year! Heptachlor will be backed by the most comprehensive regional advertising programs in Heptachlor history. Farm magazines, newspapers, radio, TV, and point of sale materials will all help you increase your sales. It's all free and all for you.

On February 9th, 1960, The Pesticide Regulation Branch, U.S.D.A., Issued specific directions allowing the continued use of Heptachlor on corn, cotton, and other major crops.



Velsicol Chemical Corporation
330 East Grand Avenue, Chicago 11, Ill.

C-310

Gentlemen: Please send me complete information about Heptachlor sales opportunities for 1960 as information becomes available.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

PATENTS and TRADEMARKS

2,927,053

Method of Destroying Fungi Employing Alkoxybenzyl Alkanol Amines. Patent issued March 1, 1960, to Jamal S. Eden, Akron, Ohio, assignor to Diamond Alkali Co., Cleveland, Ohio. The method of controlling fungus growth which comprises applying as a fungicide a composition containing as an essential active ingredient a compound having the formula



wherein R is a terminal hydroxy substituted lower alkyl group.

2,927,014

Method for Killing Plants. Patent issued March 1, 1960, to Lewis Edward Goyette, Richmond, Va., assignor to Virginia-Carolina Chemical Corp., Richmond. A method for killing undesirable plants which comprises contacting the plant at any stage of its growth with a herbicidal amount of a compound selected from the group represented by the formula:



wherein R and R' represent alkyl



MURIATE
OF POTASH
for the
PLANT FOOD INDUSTRY

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Southwest Potash Corp.

groups each containing from 2 to 8 carbon atoms and X and Y are positive whole numbers whose sum is 3.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (1) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 26.5.) As provided by Section 31 of the act, a fee of \$25 must accompany each notice of opposition.

Endit-76, in hand-lettered style, for fungicide for lawn diseases and for killing weeds. Filed Feb. 2, 1959, by Lawn Products Corp. of America, Chicago. First use Sept. 15, 1958.

Pepril, in capital letters, for herbicides, fungicides, rodenticides, and insecticides and for other chemical products. Filed April 8, 1959, by Pechiney-Progil (S.A.) Societe pour le Developpement et la Vente de Specialites Chimiques, Paris, France.

Morpro, in capital letters, for pesticides and arsenous weed killer. Filed Oct. 17, 1958, by Moore Maintenance Products, Haddonfield, N.J. First use in March, 1958.

Carbyne, in capital letters, for weedicide. Filed March 30, 1959, by Spencer Chemical Co., Kansas City, Mo. First use March 23, 1959.

"Red" Emm, in capital letters, for herbicides and pesticides. Filed May 11, 1959, by Monsanto Chemical Co., St. Louis. First use April 10, 1959.

Malacoat, in capital letters, for insecticide. Filed July 22, 1959, by M.F.A. Oil Co., Columbia, Mo. First use April 9, 1959.

Die-Termite, in hand-lettered capitals, for termite insecticide. Filed Sept. 21, 1959, by Triangle Chemical Co., Macon, Ga. First use on or about March 31, 1959.

Ferti-Start, letters imposed on triangular drawing, for fertilizer in dehydrated, concentrated water-soluble powder form, and in liquid form, for use in transplanting solutions. Filed June 4, 1959, by Clover Chemical Co., Pittsburgh, Pa. First use Sept. 11, 1958.

Bat, in capital letters, for plant food and fertilizer. Filed Sept. 3, 1959, by Robert Ziebarth doing business as Ziebarth Co., Los Angeles, Cal. First use July 7, 1959.

Garden World, in capital letters, for fertilizers, peat humus and peat moss. Filed Sept. 16, 1959, by Garden World, Inc., Flushing, N.Y. First use in March, 1950.

Unipel, in capital letters, for fertilizer. Filed Sept. 21, 1959, by California Spray-Chemical Corp., Richmond, Calif. First use Aug. 24, 1959.

Alfabor, in capital letters, for liquid fertilizer. Filed Sept. 25, 1959, by Flo-Lizer, Inc., Kingston, Ohio. First use Sept. 9, 1959.

Coran, in capital letters, for liquid fertilizer. Filed Sept. 25, 1959, by Flo-Lizer Co., Kingston, Ohio. First use Sept. 9, 1959.

Solustart, in capital letters, for liquid fertilizer. Filed Sept. 25, 1959, by Flo-Lizer, Inc., Kingston, Ohio. First use Sept. 9, 1959.

Delaware Chemical Employment Remains Firm

WILMINGTON, DEL.—Employment in chemical manufacturing in Delaware remained firm during January. The employment level was estimated at 27,000, the same as in December, according to the monthly report of the Delaware Unemployment Compensation Commission.

The number of workers in the chemical industry is 200 higher than January a year ago when 26,800 were employed.

Average weekly earnings of the production worker declined between December and January from \$126.99 to \$125.86. A drop was noted in average hourly earnings, \$3.04 in January and \$3.06 in December. A slight decline was shown in the work week, 41.4 hours in January and 41.5 in December.

SNOW TROUBLE

OKLAHOMA CITY, OKLA.—Cold weather with continued snows, rains and hail, is hampering Oklahoma farmers in their preparation of fields and further seeding. Field work has been limited to the south and west sections and a warm drying interval is badly needed to seed spring oats and barley. Winter wheat and other small grains have been held back by the extreme cold. The southern counties are affording considerable winter pasture.

Eastern States Farmers' Fertilizer Manager Dies

WEST SPRINGFIELD, MASS.—J. Raymond Myers, manager of the fertilizer production department of Eastern States Farmers' Exchange, died recently of a cerebral hemorrhage at his home in York, Pa.

His death was completely unexpected, as he was in his usual good spirits at the Eastern States annual meeting in Springfield, Mass., two days earlier.

Mr. Myers was born Oct. 31, 1905, on his family's farm in Greencastle, Pa. He later purchased and operated this farm, after attending Messiah College and Pennsylvania State University.

He became Eastern States local representative at Greencastle in 1929. In 1935 he became an Eastern States employee as the first manager at Chambersburg. Later, after service as a fieldman in Pennsylvania, he moved on to become the first joint manager of the three Eastern States fertilizer plants, in 1944.

For a time his headquarters were at the Cambridge, Mass., plant, but since 1950 at the York, Pa., plant. The Eastern States fertilizer plants at Kittanning, Pa., and Detroit, Mich., were designed and constructed under his supervision.

Louis C. White Joins Dairyland Fertilizers

MARSHALL, WIS.—Lewis C. White, Columbus, Wis., was named manager of the pesticide and farm chemicals department of Dairyland Fertilizers, Inc., Marshall, announced Ray L. Pavlak, president of the company.

Mr. White comes to Dairyland with long experience in the farm chemical field. He formerly was in business for himself and has a wide acquaintance with farmers, as he has worked with many of them in Wisconsin assisting them with their insect and weed spray problems.

Mr. White will work directly with dealers and sales personnel of Dairyland keeping them informed of the advantages and methods of use of new sprays and granular chemicals needed by farmers today.

Many farmers will be assisted by Mr. White in converting their weed sprayers to use nitrogen fertilizer as a spray on their corn stalks before plowing.

Mr. White was born on a farm in York Township, Dane County; was graduated from Columbus High School and received his bachelor of science degree in agriculture from Wisconsin State College at Platteville.

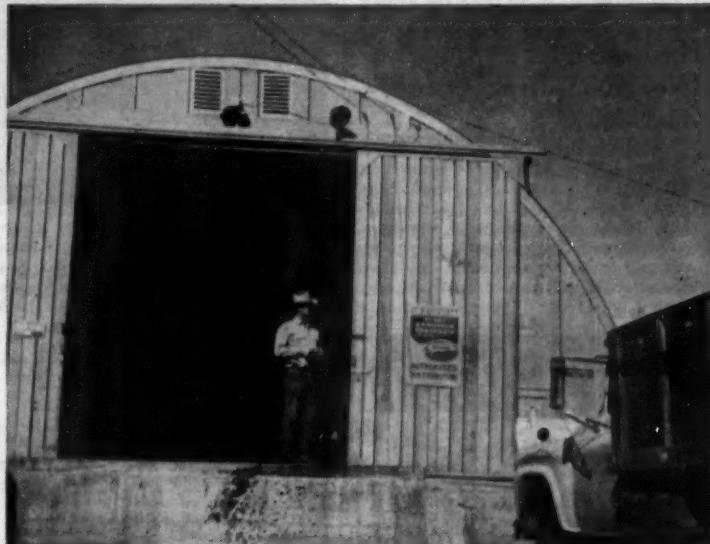
ASSOCIATION FORMED

PHOENIX, ARIZ.—Articles of incorporation have been filed for Arizona Aerial Applicators Assn. here, listing as incorporators: John F. Nease, James H. O'Connor and Margaret C. Blakely.

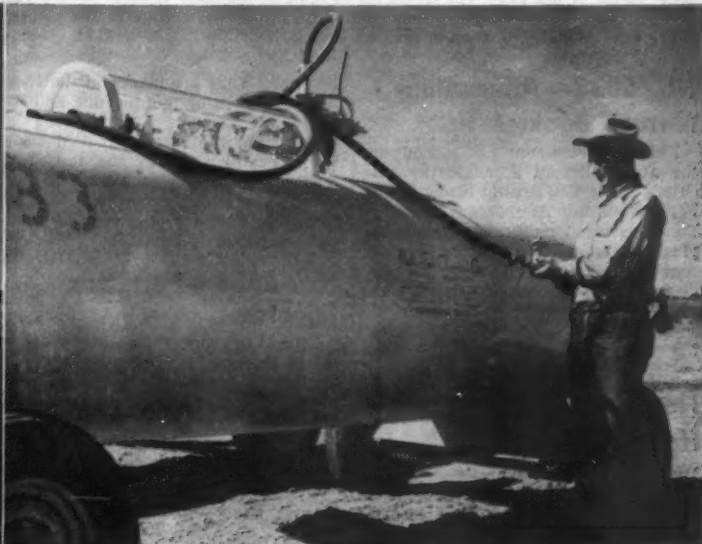
SPECIAL
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NEWS AND
FEATURES



PAT-SOL CHEMICAL CO., P.O. Box 528, Brownfield, Texas, buys liquid fertilizer from a local fertilizer plant and sells most of it through custom application. In the left photo, Sol Davis, co-owner, stands in the doorway of



the firm's large warehouse. In the right photo, Mr. Davis makes ready to fill a tractor applicator tank from this 1,000 gal. storage tank of anhydrous ammonia.

By Applying It Themselves . . .

Texas Fertilizer Dealers Sell Results

By JESS BLAIR
CropLife Special Writer

The only way to sell fertilizer and be sure of the results is for the dealer to apply it himself. At least that is the philosophy of the Pat-Sol Chemical Co. of Brownfield, Texas. Proof of this theory is that the company sold 1,200 tons of dry fertilizer

and 670,000 lb. of anhydrous ammonia in 1959.

"We applied all the anhydrous and over half the dry fertilizer," said Sol Davis, co-owner of the firm with Pat Ramseur, who takes care of the store while Mr. Davis tends to all field work.

This sales figure was achieved by

following several methods. Mr. Davis had been a farmer in the area before rigging up his tractor and applying fertilizer for another company. When he and Mr. Ramseur bought out their present store, he used this experience with good results.

"First, we must know the farmer's

soils and crop plans," he said. "This means a lot of soil tests, which we take or the farmer does himself. We then send the samples off to one of three laboratories, which will cost the farmer from \$1 to \$2.50 per sample."

When the analysis returns, Mr. Davis works out a fertilization plan with the grower. The man reveals

(Turn to SELL RESULTS, page 12)

Manufacturers' Representatives Help Arkansas Success Story

By ED WHITE
and EMMETT ROBINSON
Special CropLife Writers

Intelligent use of the agricultural chemical manufacturer's representative is one of the keys to the success of the C. D. Hare & Son Seed Store in Hope, Ark. "We found that our manufacturers' representatives made services available that we couldn't get anywhere else," says Calvin Hare, the son in the C. D. Hare & Son name. "Now, when one of our customers has a particularly thorny production problem that we can't handle we know that we can get the answers pretty quick from our manufacturers."

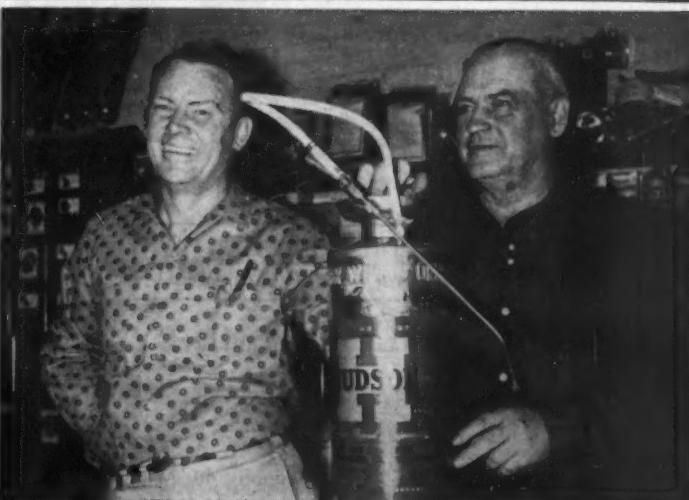
Much of this assistance is channelled towards the Hare's cotton growing customers where efficient insect control often means the difference between profit and loss. "Many cotton insect control problems still aren't understood," Mr. Hare points out. "When a farmer is having a tough time with the boll weevil we get our manufacturer's representative to check on it with us. Most of the time we are able to set up a satisfac-

tory chemical application schedule and bring the weevil under control. When that happens we have a happy customer, and often, a better customer. The technical men made available to us by our suppliers are invaluable."

Although Hope is best known for its huge watermelon crop it is one of the best diversified farming areas in Arkansas. Cotton is a major crop and the sales of cotton insecticide makes up the major item in the store's gross sales. Cotton insecticides brought in \$40,000 last year and the firm expects to sell at least twice as much this year.

Mr. Hare believes that improper application of insecticides is one of the major problems in insect control and he hopes to increase his sales by helping the farmer become more efficient. "We want to work closely with most of our customers on their insect control program," Mr. Hare comments. "By showing them just how effectively our products can work for him we think the farmer will use more farm chemi-

(Turn to SUCCESS STORY, page 12)



DOWNTOWN LOCATION makes it easier for customers of the C. D. Hare & Son Seed Store (top photo) in Hope, Ark., to combine their supply purchases with other shopping. The bottom shows the father and son partner team that runs the operation. Calvin Hare, right, and C. D. Hare find that garden supply items are a growing and profitable segment of their business.

WHAT'S NEW

IN PRODUCTS • SERVICES • LITERATURE

To obtain more information about items mentioned in this department simply: (1) Clip out the entire coupon in the lower corner of this page. (2) Circle the numbers of the items of which you want more information. Fill in the name and address portions. (3) Fold the coupon double with the return address portion on the outside and fasten the edges with a staple, cellophane tape or glue. (4) Drop in the mail box.

No. 6032—Ammonium Nitrate Booklet

Phillips Petroleum Co. announces the availability of a publication entitled "Facts You Should Know About Fertilizer Grade Ammonium Nitrate." The illustrated publication was compiled by the company to "briefly and concisely set forth the basic properties of and pertinent information on ammonium nitrate," the company says. For copies, check No. 6032 on the coupon and mail.

No. 6034—Tag Handling Machine

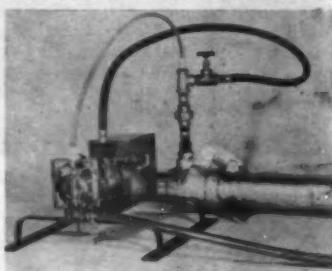
A tag handling machine called Tag-All is being manufactured by K & S Metal Products Co. and distributed to user-dealers or salesmen by Hanson



Sales Co. Tags are placed in the tray at the bottom of the machine and by means of vacuum, a single tag is raised from the stack and held until the operator removes the tag. The portable machine adapts itself to any speed operation, according to the company. For details, check No. 6032 on the coupon and mail.

No. 6036—Fertilizer Injector

Literature concerning the "Automatic Injector" for the injection of fertilizer into sprinkler irrigation sys-



tems has been prepared by Arcadia Pump Manufacturing Co. The system is powered by irrigation water pressure. One 1/4 in. pipe opening is needed to connect with the injector. The unit is light, compact and easy to operate, the company says. The line of flow of corrosive fertilizers is through clear plastic visible self-flushing check valve. The unit includes a fertilizer plastic suction hose, power and injection hoses with self-flushing sand screen. Fertilizer capacity is from 3 to 45 gal. an hour. For more information, check No. 6036 on the coupon and mail.

Send me information on the items marked:

- No. 6021—Sprayer Manual
- No. 6022—Tank Fittings
- No. 6023—High-clearance Sprayer
- No. 6024—Sprayer Catalog
- No. 6025—Spray Mulch Booklet
- No. 6026—Product Catalog
- No. 6027—Product Display Stand
- No. 6028—Fertilizer Spreader
- No. 6029—Scale Literature

(PLEASE PRINT OR TYPE)

- No. 6030—Weed Killers Brochure
- No. 6031—Crab Grass Herbicide
- No. 6032—Ammonium Nitrate Booklet
- No. 6033—Static Electricity Neutralizer
- No. 6034—Tag Handling Machine
- No. 6035—Pre-Emerge Spray Equipment
- No. 6036—Fertilizer Injector

COUPON NOT VALID AFTER 60 DAYS

NAME

COMPANY

ADDRESS

CLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS
PERMIT No. 2
(Sec. 34.9,
P. L. & R.)
MINNEAPOLIS,
MINN.

BUSINESS REPLY ENVELOPE

No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

Croplife

P. O. Box 67

Reader Service Dept.

Minneapolis 40, Minn.

is effective as a spark retardant in hazardous operations. Effect of the product is cumulative so that continued use provides a durable static freedom. It dries instantly and in-



No. 6031 Crab Grass Herbicide

Amchem Products, Inc., announces "No-crab," a herbicide designed to prevent crab grass, kill dandelions, plantain, chickweed and other broadleaf weeds, and grub-proof the lawn. According to the company, the product can easily be applied in any lawn spreader. It will sell in an 18 lb. bag, which will treat 1,000 sq. ft., and a

visible, and can be applied by swabbing, wiping, spraying with hand pump or power spray or by fogging onto material by means of fully automatic jet nozzles. For details, check No. 6031 on the coupon and mail.

Also Available

The following items have appeared in previous issues of Croplife. They are reprinted to help keep dealers on the regional circulation plan informed of "What's New."

No. 6025—Spray Mulch Booklet

Alco Oil & Chemical Corp. announces the introduction of "Vulcanol" for use as a spray mulch along highways and landscapes to control soil erosion and speed seed germination. A color booklet, describing in detail the advantages, applications and equipment required; recommended dilutions, typical Vulcanols, and the colors in which they are available, can be obtained by checking No. 6025 on the coupon and mailing to this publication.

No. 6028—Fertilizer Spreader

A fertilizer spreader that can be attached to the plow or to the front end of the tractor has been an-



nounced by Greystone, Inc. Called the "P.D.Q." the spreader spreads fertilizer ahead of the plow, with the plow then turning the soil and plowing under the fertilizer. Spread in this way, the company says, the fertilizer cannot wash or blow away. It handles all dry commercial fertilizers, the company says. For more information check No. 6028 on the coupon and mail.

No. 6035—Pre-emerge Spray Equipment

Treco Manufacturing Co., Inc., announces the availability of a line of pre-emerge spray equipment. Two, four and six row units are included, as complete sprayers or as kits for adding to spray equipment already owned. Nozzle mount brackets are easily attached to each packer wheel,



the company says, and accurate adjustments can be made in any direction to correctly position the special nozzle. A 50 mesh stainless steel line strainer, plus individual nozzle screens protect the tips. For details, check No. 6035 on the coupon and mail.

No. 6033—Static Electricity Neutralizer

Statikil, Inc., announces a formula is available packaged in self-spraying cans or bulk for neutralizing static electricity. Among some of the suggested industrial uses are for industrial machinery, meters and indicators. The company says the product

No. 6024—Sprayer Catalog

Universal Metal Products Co. announces the availability of a 24-page catalog, known as U-60, illustrating its complete line of sprayers, dusters and allied products. The catalog includes five pages on the company's "Stroll'n Spray" compressed air series. Also included are dimensions, specifications and shipping information on every other company product. Covered are the hose-end sprayers, pump-gun sprayers, easy-carry

oval-tank compressed air sprayers, power sprayers, slide sprayers, flame sprayers, fire fighter sprayers, knapsack sprayers and many others. For copies check No. 6024 on the coupon and mail.

No. 6027—Product Display Stand

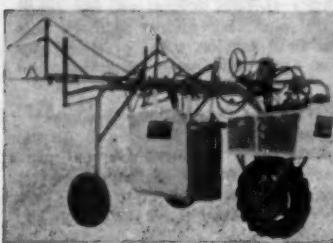
Douglas Chemical Co. announces that it will again offer its four-color wire rack display stand to retailers for a compact point-of-purchase piece. The stand, designed to hold a large assortment of Douglas products



for use in controlling grain destroying insects and pests, measures 4 ft. high, by 2½ ft. wide. Along with the rack, a complete point-of-purchase display program is offered, the company says. For complete details check No. 6027 on the coupon and mail.

No. 6023—High-Clearance Sprayer

Another model Hahn Hi-Boy Sprayer has been added to the line of Hahn, Inc. Designated Model H-180, the machine is designed to provide low-cost spraying for any size farm, the company says. The model has many of the same features as more expensive models in the line, including aluminized-steel tank (150 gal.) and eight-row Ever-Level boom. Other features include an 18 h.p., two-cylinder Wisconsin engine with



four speeds forward and one reverse; "Live" pump drive for instant spray pattern; tread width adjustable to work 38 in., 40 in. and 42 in. rows, and boom height adjustable from driver's seat from 1 ft. to 12 ft. For details check No. 6023 on the coupon and mail.

No. 6022—Tank Fittings

Information on its line of valves, gauges and indicators is available from Texas Tank, Inc., in a bulletin describing its full line of tanks for holding anhydrous ammonia. Some tanks are for stationary use and others are mounted on farm wagons for transporting the material to work locations. Auxiliary equipment includes outage gauges, vapor return, pressure gauges, liquid level gauges, combination liquid fill and withdrawal valves and hose assemblies. Full information is available by checking No. 6022 on the coupon and mailing to this publication.

No. 6030—Brochure on Weed Killers

Reasor-Hill Corp. announces the availability of a brochure called "Now—Granular Weed Killers." The color illustrated publication is a reprint of an article by a U.S. Department of Agriculture research engineer. It contains information on granular weed killers, including advantages and disadvantages. Microscopic illustrations of some common carrier materials are contained. For copies of the brochure check No. 6030 on the coupon and mail.

No. 6029—Scale Literature

The full line of Toledo scales for industrial use is presented in literature released by Toledo Scale, Division of Toledo Scale Corp. The broadside illustrates and describes stand-

ard Toledo weighing equipment including portable, bench, floor, built-in, motor truck, counting, net weight packing and mail and parcel post scales. Several types of Toledo equipment custom-built to user needs are also briefly described. For a copy check No. 6029 on the coupon and mail.

No. 6021—Sprayer Manual

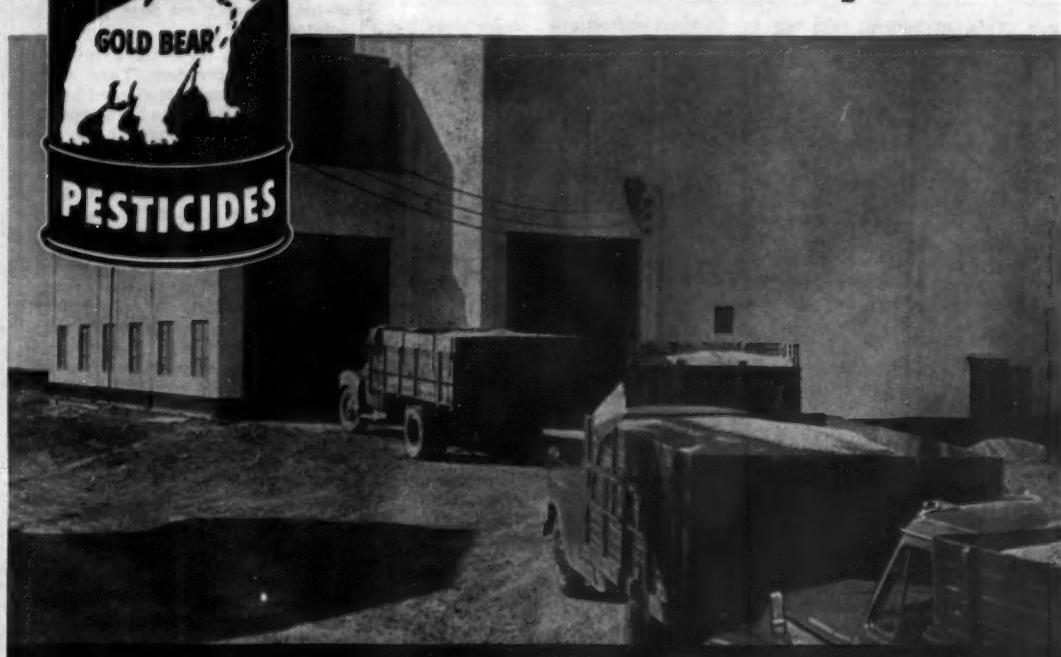
Century Engineering Corp. has published a new sprayer manual for 1960, containing information on how to select the right sprayer for application of pesticides on livestock, pastures, and row crops; and also the correct type of equipment for use in applying fertilizers. Diagrams of spray patterns are shown, as are cut-away pictures of equipment. Written instructions are presented to stress the importance of timing, descriptions of jet sprayers and boom sprayers, and a chapter on the con-

trol of weeds and insect pests. The booklet is available by checking No. 6021 on the coupon and mailing to this publication.

No. 6026—Product Catalog

Schelm Brothers, Inc., announce the availability of Catalog No. 60, containing descriptions of its line of application equipment for nitrogen solutions and liquid mixed fertilizers. The catalog has illustrations and drawings of all the major components of its line, plus specifications and data on each. Sections are included on aluminum tanks, solution transfer units, skids for tanks, pull type applicators, spray booms and a section on repair parts and accessories. A price listed is inserted. For copies of the catalog check No. 6026 on the coupon and mail.

Swift's EXTRA MEASURE of Pesticide Quality...



PAYS OFF at the Market Place

What a beautiful sight when the harvest moves to market. And right now you can help assure hundreds of extra harvest dollars for your customers by stocking Gold Bear pesticides . . . weed killers—insecticides—fungicides. That's why Gold Bear belongs in this market picture.

Why Gold Bear? Two reasons: First—the ingredients—the finest of the old, and the tested of the new . . . all selected for quality, potency and life in storage.

Second—ever-watchful quality control of

every ingredient and process to assure your customers of trouble-free, uniform application and higher killing power with either liquids or dusts.

Find out what the Swift name and Gold Bear pesticides can do for your sales. Write on your letterhead to: SWIFT & COMPANY, Agricultural Chemical Division, Chicago 9, Illinois.

Swift
105th YEAR

To Serve Your Industry Better

MAC DOLLAR says:

J
WHEN YOU'RE SELLING TO MAKE MONEY, SWIFT'S YOUR FINEST LINE!
J



A WIDE DOUBLE DOOR enables customers of the C. D. Hare & Son Seed Store, Hope, Ark., to back their trucks into the salesroom. Farmers are enthusiastic about this added touch of service.

SUCCESS STORY

(Continued from page 8)

cals. This, of course, is going to help us."

Personal contact with customers is one thing Mr. Hare emphasizes. "You can't sell on product identification alone anymore," he says. "It used to be that you could sell a man on using a product because it had a good name. Now there are so many chemicals doing a good job that you can't rely on brand name alone. Of course you have to have a good product to sell. But you have to get on a customer's farm and prove to him that the products you handle do the kind of job he expects them to."

Mr. Hare backs up his personal contact work with newspaper and radio advertising campaigns. This is another area in which he relies on his manufacturers. "We try to take advantage of all the co-op advertising offered to us," he says. "Most of the advertising money is budgeted into radio spot campaigns. We think that the noon hour is best and we like radio a lot. However, we have used the county paper, too." The advertising is planned around seasonal items and is increased proportionately during the spring and summer.

"You have to keep one step ahead of the farmer," Mr. Hare contends. "Too many of them still do not plan far enough ahead. We start pugging seed and fertilizer about six weeks ahead of planting season, insecticides about planting time, and so on. But every year they line up for seed and fertilizer the morning they want to start planting."

"Fertilizer is not a big item at the company," Mr. Hare says. "However, several times last year we ordered fertilizer in carload lots to be delivered directly to the farmers rather than to the store. In that way we saved the time and expense of hauling it to the store and then to the farm. And we didn't have to worry about broken bags and similar losses." Mr. Hare moved about 550 tons of fertilizer last year via the direct shipment method.

Mr. Hare became interested in the farm supply business by making purchases for the farm he and his father operate. The firm was founded as a seed business three years ago. Volume increased about 45% the first year of operation and a like amount the second year. Two months ago the father and son

team moved into a larger store just off the square in Hope.

Mr. Hare finds that being a farm operator himself has its advantages in the farm supply business. He is able to keep abreast of farm production problems. And frequently he tests products on his own farm so that he will be able to advise his customers on the most effective ways to use his products.

The company has a large salesroom measuring 75 by 60 ft. Most of the floor space is devoted to neat island displays of seed, chemicals and related products. A counter flanks one side of the room which is backed with shelf displays of garden supply items, animal health products and hand sprayers. The large office is separated from the sales room by a glass partition.

About one-third of the salesroom is devoted to well arranged stacks of bagged seed, feed and farm chemicals. These are items which are stocked in quantity according to seasonal demand. A large door enables the farmer to back his truck into the store and load directly from the floor. "It saves the farmer time," Mr. Hare says. "And when his truck is in the store we can usually suggest other items he may need and load them on his truck right away. Our customers seem to like the idea—especially in bad weather."

The firm employs three inside salesmen (including the father and son partners). Calvin Hare's wife keeps the ledgers up to date and the number of truck loaders varies according to the season.

Ortho products constitute the main line of farm chemicals along with herbicides manufactured by Swift. Fertilizer brands include Mule Brand and Swift and the firm has just added the Darco feed line. Various brands of feed and garden seed are offered along with locally purchased seed.

Mr. Hare estimates that 95% of his business is conducted with farmers. However, the sale of garden seed and garden supply items is increasing and the Hares plan to put added pressure behind the garden supply line because of the potential sales growth and higher profit possibilities.

The Hares have little to worry about in the way of credit. "We'd like to operate on a strictly cash basis," the elder Mr. Hare says, "but credit is a strongly entrenched institution with the farmer in this area. We are careful about who we extend

credit to so we have very little trouble collecting it. Last year we carried \$22,000 on our books and have collected all but \$118 of it. I know the man who owes us that and I'm sure that we'll be paid within the next few days." The company offers credit ranging from 30 days to six months.

"Store hours?" Calvin Hare says. "Well, usually we are open six days a week from seven in the morning until six at night. But during the spring and summer we'll open at 5:30 in the morning and stay open until the last order has been filled. And if a customer needs something at other hours, he'll get it."

The Hares offer this five point program for an expanding farm supply business:

1. Know your chemical products.

You just can't send a man an order of insecticide and tell him to read the label. You often have to show him how it works and how to use it to get the best results.

2. Be careful when extending credit. A customer's best credit reference is your own knowledge of the man himself.

3. Offer service. Help the customer with his production problems and get his order to him when he wants it. Service is 50% of success.

4. Avail yourself of the services offered by your suppliers. These people are experts and they can help you tremendously.

5. Let your customers know that you are always glad to see them and that you appreciate their doing business with you.

SELL RESULTS

(Continued from page 8)

when he wants the fertilizer put down and the amount. Then Mr. Davis gives him a booking date, which is from Feb. 1 to just before planting time, depending upon when the farmer wants it.

"By spring we have most of our fertilizer booked," said Mr. Davis. "We have three tractor rigs which cover three rows apiece, and each one will go over about 20 acres a day. Thus we usually can get to the field within two or three days of the appointed time."

The owners have three men who operate the spreaders. They are all farm-trained and experienced in their work. One of them has been appointed manager of the equipment. He oversees the other two drivers and checks machinery regularly. If a new man is used, this supervisor goes with him for a day or so until the employee learns enough to go it alone.

"We never rent a machine," said Mr. Davis, "because the average farmer would use it only four or five days a year, and has too much trouble getting the applicators calibrated. Such a practice gives uneven yields and proves too expensive to the grower."

The company is after results more than anything else. Their charges are higher than the average company gets, so they must get larger yields to stay in business. They charge \$1.75 per acre for the application plus the cost of materials.

"Any driver will cost \$1 an hour or more," said Mr. Davis. "Then you must consider the fuel, upkeep and wear on a \$4,000 tractor and a \$2,200 fertilizer tank and spreader. We've seen too many companies go broke who put out fertilizer at \$1 an acre."

One proof that farmers do not mind paying extra for good service is the fact that Pat-Sol did not solicit one extra customer in 1959. They held all their old customers and got several new ones who came because of the firm's reputation.

In order to keep good operators the firm hires them on a year-around basis. The owners also have two mechanical cotton strippers and one picker. This keeps the employees busy during the late fall and early winter, when it is time to start fertilizing again. In the summer time there is a busy period of putting on sidedressing. When none of these jobs are in operation, the men are used in repair work, building and trucking.

Another profitable phase of the firm's business is in selling insecticides. This compares favorably with fertilizer sales, though the firm does no custom application.

"Most farmers prefer to use airplanes for the tall cotton grown here," said Mr. Davis, "so we made an agreement with an aerial applicator who has several planes. We get

the jobs for him and furnish the material."

One thing that has boomed these sales has been in giving farmers a free field inspection service. Each summer Pat-Sol hires two senior entomology students from nearby Texas Technological College at Lubbock.

These young scientists visit each customer's cotton field when insects are due. Then they inspect each of these fields twice weekly until insect season is over. Each boy writes a report of what he has found and turns it in to the office. If possible, he takes the farmer over the field with him, points out insect signs and gives his opinion on when to treat the field and what insecticide is most applicable.

Mr. Davis or Mr. Ramseur telephones the airport where the aerial contractor is located, gives him the name of the farmer, size of field, kind of insecticide to use and the location of the place.

The contractor may pick up the chemicals at the company's store or from tank cars. Payment is made to the company and then after chemicals are deducted, the rest of the money goes to the contractor.

"Hiring entomologists was a very profitable move," said Mr. Davis. "These boys know their insects and are willing workers. They need some experience and also the summer's wages."

"In our work with farmers we get a regular profit on insecticides. Even though some dealers cut one another's throats on prices, we never lower ours. By giving farmers this free field service, most of them buy from us and never question the price."

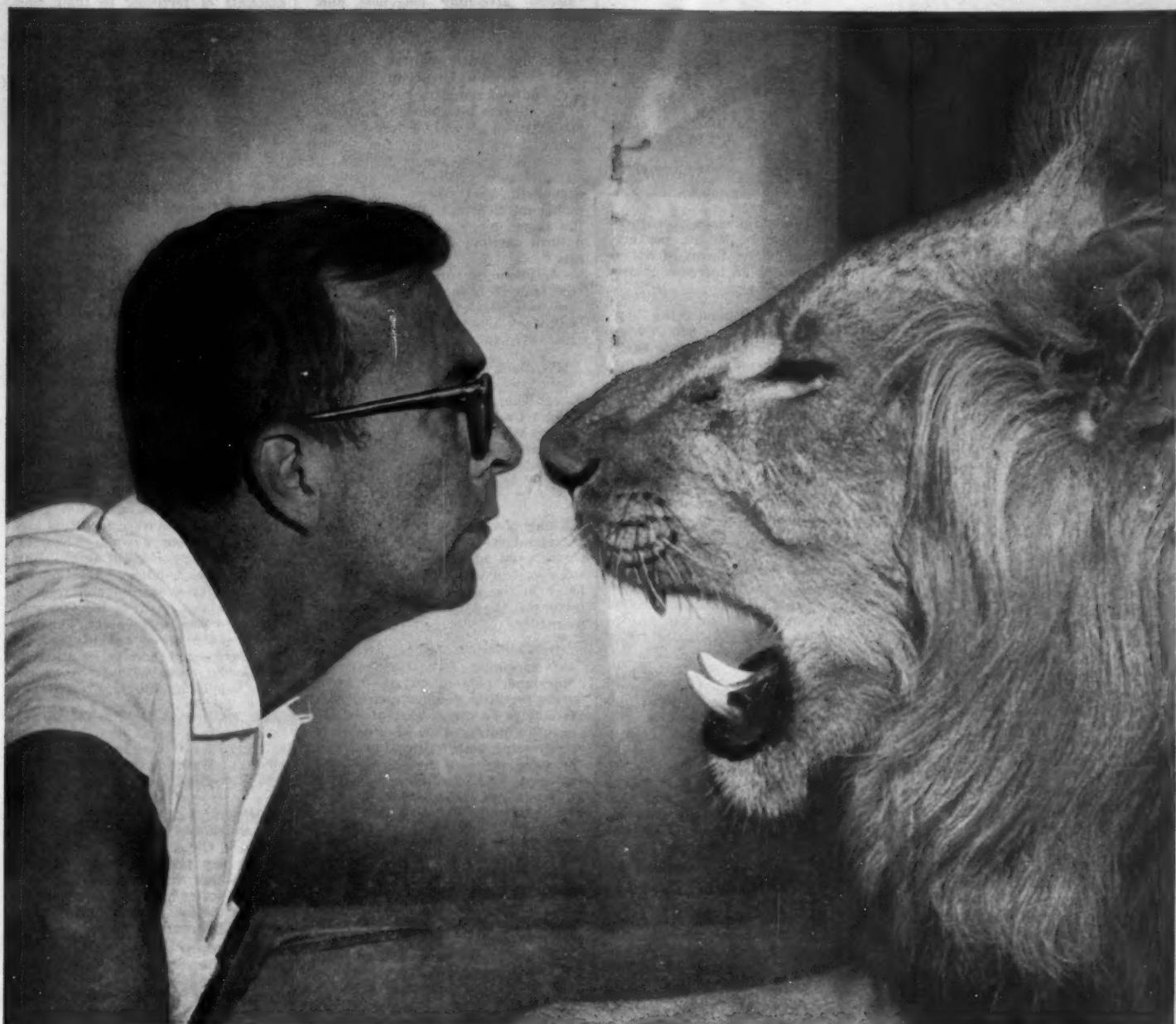
One nice thing about this agreement is that there is no limit to future sales. The firm can cover an unlimited number of fields by hiring more entomologists and the contractor can get all the planes he needs.

In summarizing the firm's success, Mr. Davis says most of it was brought about by giving farmers extra service. This requires much extra time and miles traveled, but it pays off.

"I put 78,000 miles on my pick-up last year," Mr. Davis pointed out, "and most of it was in visiting farms. I think our sales and profits justified it, however. During busy seasons Pat and I never count the hours. We work just as long as the farmers do, and sometimes that may be 12 to 15 hours a day."

ELECTED PRESIDENT

HAGERSTOWN, MD.—Gilbert Miller of Spring Gap is the new president of the Maryland State Horticultural Society. He succeeds D. Eldred Rinehart of Ringold. Other newly-elected officers are Raymond K. Gardiner of Smithsburg and John W. Milburn of Elkhorn, vice presidents, and A. F. Vierheller of College Park, secretary-treasurer.



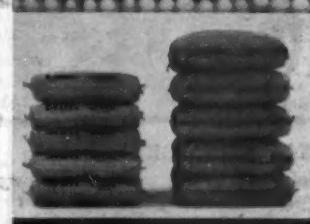
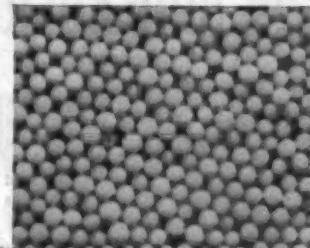
Why you should take a close look at LION E-2*

You don't have to look this close to see the advantages of selling Lion E-2 Ammonium Nitrate. The first thing you'll notice is that Lion gives you a definite storage advantage because of its super-density. An 80-lb. bag of Lion E-2 is 20 to 25% smaller than an 80-lb. bag of any other brand. Thus, the storage space you save with Lion E-2 can be used for 20 to 25% larger inventories to make more profit.

You feel the second advantage when you pick up a bag of Lion E-2. The bags are coated with Syton®, a special Monsanto anti-slip agent that lets you and your customers get a better grip for faster, safer handling.

Lion E-2 gives your customers another big advantage, too. Because Lion E-2 is super-dense, farmers can load more in their spreaders . . . actually eliminate one out of every five refill stops! And, Lion E-2 is guaranteed at least 33.5% vital nitrogen for maximum yields.

If you want the "lion's share" of ammonium nitrate sales in your area, take a close look at Lion E-2. You'll like what you see! Want more information? Just roar! LION E-2, Monsanto Chemical Company, St. Louis 66, Missouri.



LION E-2 is the only ammonium nitrate on the market that can save 20 to 25% of your valuable storage space. Because each Lion E-2 prill contains less useless air, you can stack *five* 80-lb. bags of Lion E-2 in the same space previously taken up by just *four* 80-lb. bags of any other brand. (Lion E-2 is a good deal for your customers, too. Because of E-2's super-density, farmers can eliminate one out of every five refill stops.)

FARM SERVICE DATA

EXTENSION SERVICE REPORTS

South Carolina farmers can increase their gross farm income by over \$524 million, says H. A. Woodle, extension agronomist with the South Carolina Agricultural Extension Service. Mr. Woodle says that this increase is possible if farmers will follow recommended fertilizer, lime, and other good management practices.

Over half of this increase or more than \$280 million can come about from better management of pastures. South Carolina statisticians figure that their 3,500,000 acres of pasture land in the state will produce an increase of 400 lb. of beef per acre. Mr. Woodle says that if such land is fertilized at a general rate of about 1,000 lb. of mixed fertilizer per acre and 100 lb. of N then these increases will be possible.

An increase of over \$60 million can come about through the proper fertilization and management of cotton alone. There are over 700,000 acres of cotton land in South Carolina which are currently being fertilized by 500 lb. per acre of mixed fertilizer and sidedressed with 30 lb. of nitrogen. Mr. Woodle says that these rates should be increased to 550 lb. of mixed fertilizer and 45 lb. of N which on the average will give an increased yield of 250 lb. of lint per acre. This will mean to the individual farmer an increased return per acre of \$86.50.

Corn is another crop which offers a real possibility for increased income to the South Carolina farmer. As far as acreage is concerned, it is the most important of the row crops produced in that state being planted over 900,000 acres. Mr. Woodle states that only 400 lb. of mixed fertilizer and 25 lb. of nitrogen per acre are being applied to corn and that this low rate of fertilization is contributing largely to the low yields and low income from this crop. South Carolina Extension Service recommends that at least 650 lb. per acre of mixed fertilizer and 75 lb. of nitrogen per acre be applied to this

crop. This should give an average increase in yield of 30 bu. per acre which translated in terms of dollars and cents means an increase of over \$40.50 per acre.

Oats, soybeans, and other hay crops can add another \$96 million increase to South Carolina's agricultural income. Small grains including wheat, barley, and rye will add another \$7.2 million in increased income if they are limed, fertilized and managed according to recommendations.

Another potential source of income to South Carolina farmers that it frequently overlooked is that which can be derived from annual winter and summer grazing crops. There are 725,000 acres of land in South Carolina devoted to these crops and by using recommended rates of mixed fertilizer and lime, South Carolina farmers can expect to get an increased income of \$33,500,000 from these grazing lands alone.

While Mr. Woodle feels that it perhaps may take several years to reach this goal of \$524 million for this state, he is optimistic about the chances. South Carolina has embarked on a series of county soil fertility programs which are dedicated to increasing the efficiency with which the farmers produce their crops. The program is already under way in seven South Carolina counties with additional counties scheduled to come in at various times in the coming year.

★

A new research grant to the University of Wyoming plant science division will enable researchers to seek control for a highly destructive tree disease in Wyoming, according to Ed Andrews, UW plant disease researcher.

The \$1,400 grant—from Upjohn Co., Kalamazoo, Mich.—will finance tests using actidione to treat Comandra blister rust, a fungus

disease attacking lodgepole pine and some ornamental plantings in the state.

Comandra rust is killing lodgepole pine wherever it grows in Wyoming, Mr. Andrews notes.

The disease hits hardest along forest edges—a favorite locations for ranch homes, resorts, and youth camps. Spores of the rust begin life on toad flax, which often grows on sagebrush land where forests join plains or clearings. In later stages, the spores move with wind or other natural carriers to nearby pine forests.

Actidione, in earlier experiments, has effectively controlled other fungus diseases—giving hope that it will work against Comandra blister rust, Mr. Andrews says.

UW plant science researchers have stopped wheat stem rust with actidione. The U.S. Forest Service and Upjohn Co. have used the antibiotic to stop white pine blister rust. Both rusts are fungus diseases similar to Comandra blister rust.

★

Yields of wheat, barley, and oats in Maryland are often reduced because there is not adequate nitrogen in the soil. Topdressing with nitrogen fertilizers in the early spring frequently increases the yields of these crops markedly.

Dr. James R. Miller, extension soils specialist of the University of Maryland, pointed out that small grain fertilizer demonstration plots conducted on farms in 12 Maryland counties during 1959 showed that topdressing with 30 lb. of nitrogen per acre increased the average yield of wheat by 6.1 bu. per acre, barley 18.3 bu., and oats 16.6 bu.

Cost of the 30 lb. of nitrogen was about \$4 per acre. In these same test plots the yields of straw were often increased by more than $\frac{1}{2}$ ton per acre with the 30 lb. of nitrogen. In many cases more than \$3 was returned for each dollar invested in fertilizer, he said.

Dr. Miller recommended on soils, where lodging is not a problem, that 15 to 45 lb. per acre of actual nitrogen be applied as a topdressing. This should be done just before growth begins in the early spring. In most sections of Maryland this is in late February and early March. Dr. Miller advised that the heavier applications of nitrogen should be used on the lighter sandy soils that are often low in available nitrogen.

He pointed out that most of the nitrogen fertilizers found on the market can be used for topdressing small grains. These include: ammonium nitrate, urea, sulfate of ammonia, nitrate of soda, nitrogen solutions, ammonium sulfate nitrate and others.

To supply 30 lb. of nitrogen per acre for the small grain, it would take 190 lb. of nitrate of soda, 90 lb. ammonium nitrate, 70 lb. urea, or 150 lb. of sulfate of ammonia.

On soils where adequate phosphate and potash were not applied at the time of planting the small grains, Dr. Miller suggests the use of a complete fertilizer for topdressing such as 10-10-10.

Dr. Miller pointed out that topdressing with nitrogen is not recommended on fertile soils where lodging is commonly a problem. Also, it is not recommended when fields have been heavily manured, or where grain follows a productive leguminous crop such as alfalfa, ladino or red clover.

★

Well fertilized crops stand up better during a drought than do poorly fertilized crops, says Dr. E. R. Collins of the department of field crops at North Carolina State College in Raleigh. This statement is borne out by the experience of farmers who make a habit of applying adequate

amounts of fertilizer to their soils, thereby getting efficient crop production each year, but especially during times of drought.

It is generally known that a well fertilized vigorous plant also has a large root system. Therefore, during the hot time of the day and especially during a drought season, the healthy root system can reach beyond its own little area of soil to obtain moisture in order to survive. Many sections of North Carolina have approximately 80 days during the period of April through October in which the moisture in the soil is exhausted if the maximum amount of soil moisture is two inches. Plants that lack adequate fertilization often have a limited root system and, therefore, are unable to get sufficient moisture for survival. The root growth of these under-nourished plants decreases and the plant takes up less water. The next familiar scene that one sees is the yellowing and dying of the leaves which decrease the food available for plant growth.

In addition to making these roots larger in order that they may grow faster to new areas of moisture, the plant roots that were fertilized are protected from excessive loss of water during periods of drought. But on the other hand, says Dr. Collins, very low levels of soil fertility, especially potash, result in the accumulation of iron in the plant. This decreases the movement of food to the roots and results in starved, weakened roots with lower moisture supplying ability.

In addition to the use of potash, lime properly used also aids plants in time of distress. It increases the amount of plant roots and tops returned to the soil each year. This return each year increases the amount of decaying vegetation. Consequently, the amount of water taken up and stored in the soil is increased for use during dry periods. Adequate fertilization improves the physical properties and water holding capacity of the soil for better growth during short periods of drought.

The proper and continued use of good fertilization practices, concludes Dr. Collins, improves the physical condition of the soil and increases plant growth. In turn, the improved physical condition increases the ability of the soil to store water and the ability of the roots to reach larger areas containing this needed water.

★

Farmers in East Texas do not use enough nitrogen on pasture and cropland. By so doing they might increase the net income \$300 million in a 60-county area.

This opinion was recently given by Dr. Thomas C. Longnecker, director of the High Plains Research Foundation at Plainview, Texas. He said that 50 lb. of nitrogen per acre would increase net profits to farmers by \$25 per acre. And since there are six million acres of row crop lands and another six million in pasture, the total production could be increased tremendously.

Dr. Longnecker said that ammonia had been used as a nitrogen fertilizer on a commercial basis in Texas since 1951, but now accounts for 65% of straight nitrogen materials used by farmers. Of this amount, however, 87% is used in West Texas, and mostly on irrigated cotton.

He thinks that ammonia industry leaders should concentrate more sales efforts in the heavy rainfall belts of East Texas. Nitrogen use in this area is almost negligible, yet it should be somewhere between 50 and 100 lb. per acre in order to give farmers the greatest possible benefits.

Even West Texas farmers are not yet using enough nitrogen. Studies in Hale County in 1959 showed that if all grain sorghum fields had been fertilized properly, the net income could have been increased \$4 million.

Covers Field With Lime or Pelletized Fertilizer in $\frac{1}{2}$ the Time! NEW LEADER L-52S SPREADER

- 25 H.P. Engine drives twin 24" spinners for widespread applications!
- Cuts in-the-field operating costs, time on the job and soil compaction 50%.
- Some owners cover an acre a minute!
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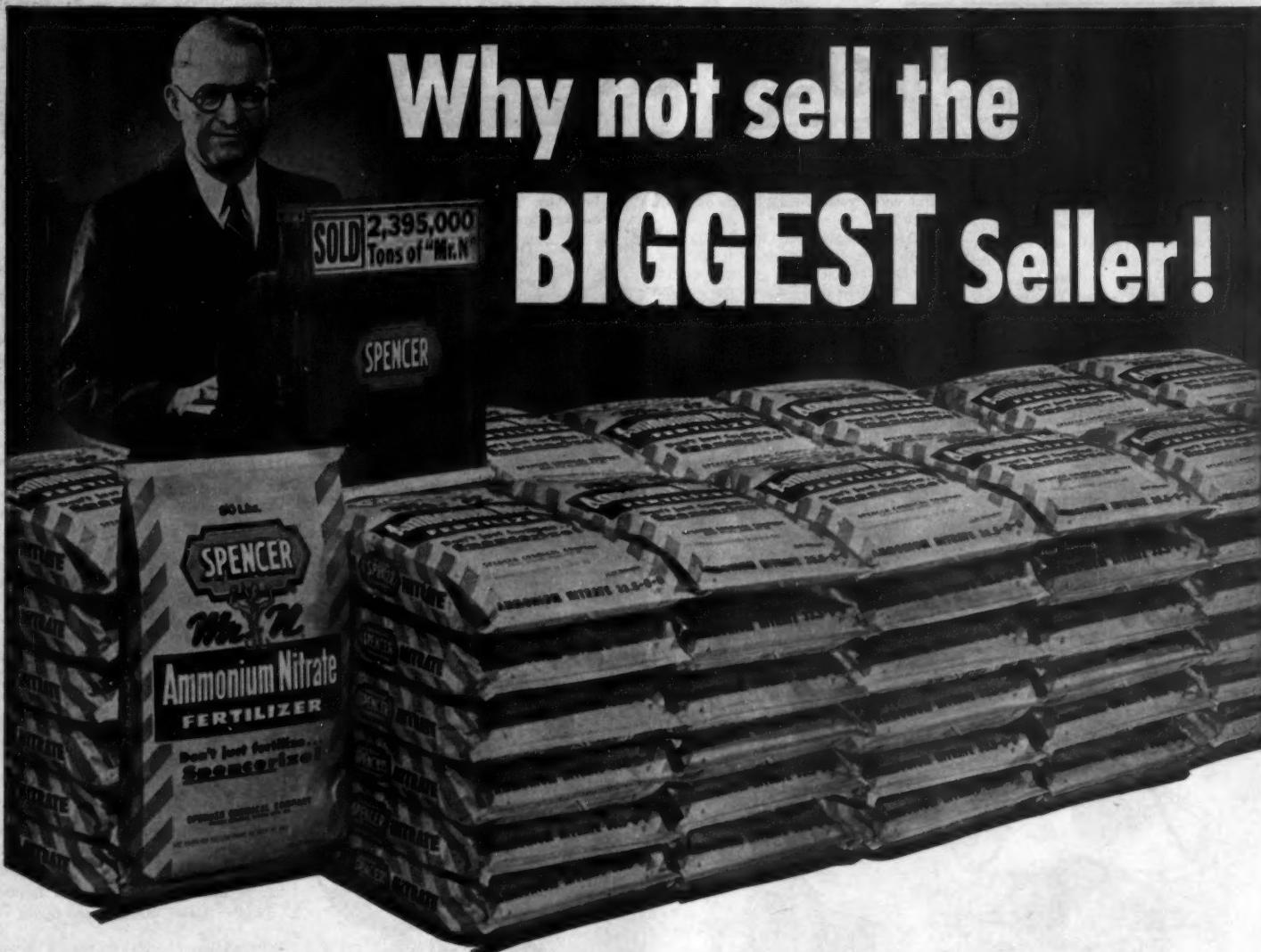
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SCHOENFELD AND MCGILLISBUDY



By AL P. NELSON

Oscar Schoenfeld came home one late winter day with clenched fists, tight lips and narrowed eyes. His wife Minnie, who met him at the door noticed his mood, and thinking to change it, said, "Oscar, I have pigs' knuckles for supper. They look so good."

Without reply, Oscar took off his coat and cap and hung them on the elk's head coat rack. "Ach, I will not do it!" he exploded. "I will not do it!"

"You won't do what?"

"Stay home on March 17th! Take a vacation—like Pat wants me to do."

Minnie looked puzzled. "Why does Pat want you to stay home on March 17th?"

Oscar snorted. "That's St. Patrick's Day. That Irisher wants to put on a big St. Patrick's Day celebration and sale. Andt he don't wantd me around. He says a German like me would spoil it. You bet I wouldn't spoil it. I would ask some of those Irishers to pay their oldt bills. There are plenty of them on our list—Shanahan, Morrisey, Ryan, Mullaney, McGinnis. Ach, I get sick thinkink how much they and others owe us."

"I don't see how you would spoil the sale," Minnie said. "You could just sit at your desk and figure dis-

counts. Couldn't you not talk back for once, Oscar, and bite your lip all day long?"

"No!" Oscar uttered his favorite word. "I don't like the Irish. Andt I don't like Pat most of all. They are always laughink and singink and makink crazy jokes. They don't stick to farmink long enough to make goot farmers, like Germans, and Poles and Scandinavians."

Minnie looked thoughtful. "Maybe they don't, Oscar, but it takes all kinds of people to make a world. Somebody should sing, and laugh and joke, and maybe God picked on the Irish to do it. I sort of like to hear all those sad and sometimes gay Irish

songs on the radio on St. Patrick's Day."

"I don't!" barked Oscar, sitting down at the table. "I hate all those Mothers McShee, or whatever-it-is-called songs and Killarney and all them. I think I will schtuff my ears with cotton that day so I won't hear them. That Irisher figures to play Irish records all day. He and Corrigan and McGinnis are goink to sing Irish songs, too. Andt they are goink to jig, and he wants to gif a prize for the best jiggers."

Privately Minnie thought this sounded like a lot of fun, but she said nothing. Finally, "Maybe, Oscar, that celebration will bring in a lot of farmers who aren't Irish—farmers, who just want to get in on the fun and see real Irishmen when they celebrate. Maybe those other farmers will buy something—for cash!"

"That Irisher will be too busy singink Irish songs to wait on the other farmers," Oscar predicted gloomily. "Andt he wants to put up a big picture of St. Patrick in the salesroom. I toldt him no. I saidt if he didt that I would put up a bik picture of the Kaiser—andt Hitler, too! That stopped him, I can tell you."

"But St. Patrick was a wonderful man," Minnie said. "They say he drove the snakes out of Ireland."

"He didt not," Oscar snapped quickly. "I haf heardt that the snakes moved out when the Irish came to Ireland."

"Oh, Oscar, maybe you should let Pat do this. Maybe there will be a lot of pictures and articles about it in the newspaper. That is what Pat calls publicity, isn't it? It makes good will and builds store traffic."

"Builds store traffic with people that ain't got no cash in their pockets," Oscar growled. "That ain't the kindt we want. Those credit people go from schtore to schtore andt buy andt then you try to collect. Traffic, bah!"

"But you couldt stay home just for that one day, Oscar. We could do some spring housecleaning. I need help on that."

"I can't do it, Minnie. I can't schtay away from the business and see Pat wreck it. Ach, I will take along some extra liver pills. If I get sick of hearing so many Irish names and jokes and songs, I will take two pills instead of one and try to standt it."

Oscar was smart. She envisioned trouble if stubborn Oscar tried to uphold Germanic thrift and seriousness amongst a small army of Irish celebrants. She tried one last appeal. "Oscar," she suggested, "you could bring your discount work home and do it here. And bring the collection list up to date."

Oscar's jaw dropped, but there was a sudden gleam in his eyes. "Collections!" he almost shrieked. "Yah, collections."

"Oscar, what is the matter? You look so strange."

Oscar chuckled. It was the first time he had chuckled in months. "The Irisher holds an Irish Day on March 17th. That's his day. He wants it all by himself. Ach, I will haf myself a day, too, also on March 17. It will be Collection Day. Let Pat singk Irish songs and tel Irish jokes and eat mulligan stew andt corn beef andt cabbage. I will take that collection list andt go and visit the farmers who owe us money. I will tell them a thing or two. Some of them I call on will be Irishers. They can't go to the schtore all day long. Some I will catch home. Andt if they don't pay I will hit them offer the head with that—that, what do they call it—a shillelagh!"

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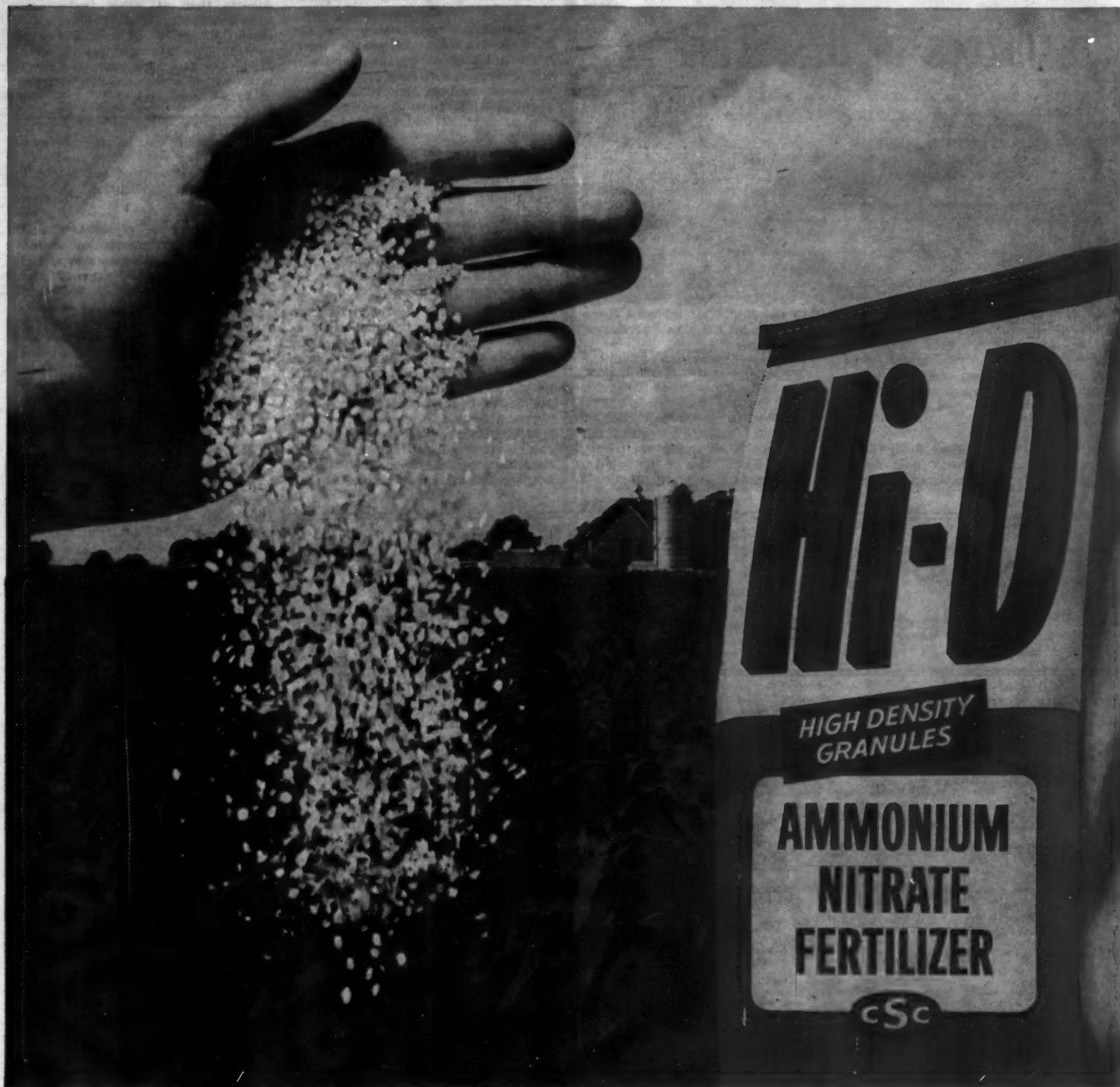
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Present Status of Liquid Fertilizers in U.S. Told

By A. V. SLACK*
Tennessee Valley Authority
Wilson Dam, Ala.

THE USE OF FERTILIZERS in liquid form is not particularly new; as far back as 1853 the use of "ammoniacal liquor" was reported in England. It is only in the past decade or so, however, that liquids have attained any prominence as compared to solid fertilizers. Liquid fertilizers have now advanced to a challenging position; for example, liquid forms of nitrogen—including anhydrous ammonia, aqua ammonia, and nitrogen solutions—accounted for about half of the total nitrogen used in direct application in 1958, even though old established fertilizers such as ammonium nitrate, ammonium sulfate, and sodium nitrate were among the solid contenders.

In the mixed fertilizer field, the liquid form is a fairly new departure. The practice began in the

Far West some 30 years ago but did not amount to much until the last decade. Today liquid mixes in California account for about 20% of the total mixed fertilizers used in the state. Use in states east of the Rocky Mountains was practically unknown until 1954. After the first plant was built in that year the practice mushroomed at a surprising rate. Today, only five years later, it is estimated that there are 256 plants in the central and eastern parts of the country. With the Far West included there are now about 354 plants producing liquid mixes.

Growing use of fertilizer in liquid form is to be expected as a development in keeping with modern technology. With any low cost chemical product used in large quantities, cost of handling is an important part of the over-all cost. Use of the liquid or slurry form is a growing practice in

handling heavy chemicals to reduce labor and other handling costs. In the fertilizer field, bulk handling of solutions or slurries can also simplify handling, especially in application of fertilizer on the farm.

Consumption reports show that anhydrous ammonia occupies a more important place in central and western states than it does in the East. Total consumption in 1957-58 was about 479,000 tons of nitrogen, as compared to 377,000 for ammonium nitrate, the runner-up. Nitrogen solutions are more popular in the South Atlantic and West North Central States. Total consumption of nitrogen in this form was about 100,000 tons. Current annual consumption of liquid mixes is estimated at over 800,000 tons. This probably represents about 200,000 tons of plant food, or about 4.5% of that applied in the form of mixed fertilizers.

Thus it is clear that liquid mixes have not made the inroads in the mixed fertilizer field that anhydrous ammonia and nitrogen solutions have in the direct application field. One reason, of course, is that liquid mixes are newer in most sections than the nitrogen liquids. A major difference, however, is that the latter usually can be produced and sold for less cost than for comparable solids. This is not the situation with liquid mixes;

WEEDS CAUSE TROUBLE

EDMONTON, ALTA.—Weeds are responsible for more crop losses in Alberta than all other factors put together, according to W. Lohay, provincial supervisor of soils and weed control. The average loss is about \$1,000 per farm per year. The figure is based on a conservative estimate of \$5 per acre loss.

these normally cost as much or more to make than solid mixes, and must depend on convenience and saving in handling and application as their main advantage.

Availability of phosphoric acid during the rush production season in spring appears to be one of the major current problems in the liquid mixed fertilizer industry. Most producers have tried to keep expensive acid storage at a minimum and have depended on the acid supplier to deliver acid when needed. This worked fairly well in the beginning of the industry but as the demand for acid has grown, both for liquid and solid mixes, the supply situation during rush seasons has become critical.

Raw material cost is also a problem. The trend is to the use of urea-ammonium nitrate solution rather than urea as a means of reducing cost for supplemental nitrogen, even though the grade is usually lowered thereby. The main raw material cost problem, however, is in regard to phosphate. The lower cost of wet-process acid in most areas has led to a major effort in finding ways to use it. The various efforts to avoid the problem brought about by the impurities in wet-process acid can be grouped under the following headings:

1. **Purifying of acid.** The problem can be minimized by giving some attention to the purity of the acid at the producing point. Some producers now do this, either by extended settling or by chemical additions to precipitate some impurities. However, the major impurities—iron and aluminum—are not removed by these procedures.

2. **Precipitation of impurities.** The iron and aluminum precipitate upon ammoniation of the acid and can then be removed by filtering, decantation, or other separation methods. The precipitate, however, contains part of the phosphate and must be recovered and used. For a producer making only liquid mixed fertilizer this is a difficult problem. For this reason the method is more applicable to plants that also produce a solid NP or NPK fertilizer, into which the settled sludge or filter cake from the acid ammoniation step can be incorporated. This method is in use, mainly in the Pacific Northwest. There, most of the liquid mixers use a base 8-24-0 solution supplied by an acid producer. Except for shipping cost, this appears to be a good way of using wet-process acid in liquid mixed fertilizers.

3. **Sequestration of impurities.** Since the producer of liquid mixes normally has no good way to handle separated impurities, he must leave them in and try to find some way to get an acceptable product. One approach is to add a sequestering agent that will prevent the impurities from precipitating when the acid is ammoniated. There are several agents which will do this but most of them are too expensive. The only one that appears promising is superphosphoric acid; the pyrophosphoric and polyphosphoric acid it contains will sequester impurities as well as supply phosphate to the solution. Work on this method is being carried out by TVA and by several producers.

4. **Suspension of impurities.** If the precipitated impurities are left in the product, they tend to settle on stand-

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Dr. E. R. de Ong

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*At Southern Regional Liquid Fertilizer Conference, Edmonton, Ga., Feb. 9-11, 1960.

ing and may clog equipment. However, if the product is not stored very long before application, little trouble usually is encountered. For longer storage it is desirable to use some means for delaying settling. Considerable work has been done by TVA on methods for suspending the impurities. Conditions during ammoniation affect the properties of the suspension, and a suspending agent such as a clay has been found helpful. One of the main problems is slow growth of crystals of magnesium ammonium phosphate; after several weeks of storage these often grow large enough to clog spray orifices. Experimental work on ways to prevent growth of these crystals is under way at TVA.

A continuing problem is the relatively low analysis attainable in liquid mixes as compared to solid mixes. Progress is also being made toward solving this problem. The various approaches and the status of each are summarized as follows:

1. Use of ammonium nitrate along with urea raises the grade for some nutrient ratios. The optimum amount varies with the ratio. In many instances, however, addition of ammonium nitrate reduces solubility.

2. The NH₄:HPO₄ ratio has a significant effect on solubility in grades low in potash. General practice is to use a mole ratio of 1.7, whereas 1.6 or 1.5 usually gives a somewhat higher grade. A few producers are taking advantage of this.

3. Use of superphosphoric acid (76% P₂O₅) gives a large increase in solubility, especially in grades low in potash. Several producers are using superphosphoric acid this season. An 11-33-0 base solution made from superphosphoric acid is also being used to some extent in cold-mix operations.

4. For grades containing potash, solubility can be increased by using potassium hydroxide or potassium carbonate rather than potassium chloride. However, these materials are so much more costly than potassium chloride that use of them merely to increase concentration is quite limited.

5. Concentration can be increased by exceeding the solubility of the nutrient salts and treating the salted out constituents to produce a stable suspension. Salting out is then no longer a major difficulty but problems in applying the product are introduced. Very high grades can be produced in this manner but much more work is needed before the practicality of the method is established and producers can use it with any assurance of success. TVA is continuing experimental work and plant-scale tests have been made by producers. Other plant tests are planned.

Earnings Rise 36%

WILMINGTON, DEL. — Atlas Powder Co.'s net earnings in 1959 rose nearly 36% to \$3,907,000 from the \$2,874,000 reported for 1958. Ralph K. Gottshall, president, stated in the 1959 annual report to shareholders.

The 1959 earnings—equivalent to \$5.15 a share, as compared with \$3.80 a share in 1958—were achieved on near-record sales and operating revenues of \$70,721,000, up 7.8% from the \$65,543,000 reported in 1958. The increase in earnings was realized despite additional charges equivalent to 58¢ a share for increases in contributions to the company's funded pension plan, depreciation and amortization, and research and development.

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CONFERENCE

(Continued from page 1)

ability relation similar to oxamide, but none of these appears to have economic possibilities. There are few opportunities for developing new potassium sources with desirable characteristics at reasonable costs of production.

For example, he said, fusion of potassium carbonate or potassium nitrate with orthoclase feldspar, to produce a slowly-soluble potassium fritted material, has been tried commercially on a small scale. Mr. Stanford said the product has little economic potential for farm use.

TVA is interested, he said, in developing a process for making potassium metaphosphate. In field tests, potassium metaphosphate has proved at least equal to conventional nutrient sources of phosphorus and potassium.

Greenhouse pot tests of potassium metaphosphate show that, in soils, large particles (about $\frac{1}{4}$ inch in diameter) are less rapidly weathered than fine particles and are, therefore, taken up less rapidly by plants.

Uptake of potassium was further retarded with larger particles, such as 1 inch in diameter. Moreover, salt injury to plants was much less than with the same amount of finely ground fertilizer applied either as the same source or as KCl plus superphosphate.

Agronomic tests will be continued on potassium metaphosphate in conjunction with pilot plant studies at least until the economic feasibility of developing a suitable product is adequately explored.

As for the phosphorus in such a material, Mr. Stanford said effects of particle size on phosphorus availability have not been adequately explored. It is clear, however, that large particles of potassium metaphosphate release phosphorus more readily than do large granules of dicalcium phosphate.

"Polyphosphates, in general, merit further consideration to determine if any direct or indirect benefits result from use of these instead of orthophosphates."

He suggested that action of pyrophosphates might modify behavior of certain trace elements such as iron and zinc in soils lacking these nutrients.

M. L. Dako of the New York Lime Assn. said the fertilizer industry is challenged to recognize changes in agriculture. He referred to fewer but larger farms and larger farm operations, a possibility of further shrinkage of agricultural conservation program assistance, a growing need for greater efficiency, and the increasing farmer demand for consultant help.

"We will have fewer farmer contacts in dealer sales rooms and more on-the-farm contacts," declared the Lime Assn. secretary. "We must build our sales program to present lime as a vital part of the whole fertilizer program."

Speaking to a record crowd of nearly 200 industry persons, Mr. Dako said the industry must aid dealers to provide complete crop service.

A good farmer approach, he said, might be a suggestion of a starting program of "corrective liming" to bring the best acres to a pH of a minimum 6.8.

"Our sales theme should be 'corrective liming' because it pays," he added.

The biggest problem in using insecticides in fertilizer is to get the insecticide timing to coincide with the fertilizer application, declared Lloyd E. Adams, extension entomologist at Penn State.

He said that most insecticide-fer-



PENNSYLVANIA OFFICERS—Officers and directors of Pennsylvania Plant Food Educational Society named for 1960 at Fertilizer-Lime Conference at Penn State University. From left, seated: Richard F. Resig, York, vice president; Dr. W. Wayne Hinshelwood, Penn State, president; Delmar K. Myers, Harrisburg, secretary-treasurer; standing, D. R. White, Gettysburg; Murry C. McJunkin, Pittsburgh; W. W. Duff, Doylestown; J. W. Bratt, New York; J. A. Dantone, Philadelphia; A. M. Eno, Ithaca, N.Y.; R. W. Fletcher, Penn State.

tizer mixes used in the Keystone State are designed for individual farmers—"a costly procedure." For the most part, insecticide-fertilizer combinations in Pennsylvania are used on potato ground for wireworm control. The next largest amount is for grub control on turfgrass.

Mr. Adams said the best method for combining insecticide and fertilizer, although costly, is to impregnate fertilizer granules with the insecticide. Another method is to mix the two in liquid form—a process requiring special formulations.

"If different sized particles of

granular insecticide are mixed with fertilizer, the biggest problem is separation," he reported.

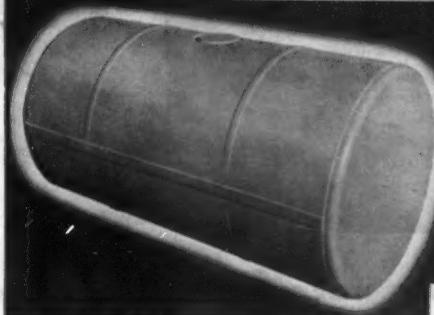
The Penn State entomologist described the spread of granular material for different rates of application. One pound an acre of 30 to 60 mesh granular insecticide gives a spread of slightly more than two particles per square inch. The material would be 5 to 25% granular. If the application is run up to 30 pounds an acre, this will give 60 particles per square inch, he said.

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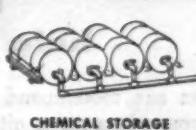
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DELANEY CLAUSE

(Continued from page 1)

should encourage research and innovation by every possible means—never discourage it," he declared. "The whole American society is built upon the cornerstone of a productive and highly efficient agriculture." He also stressed that modern agriculture "cannot continue to produce adequate amounts of safe and wholesome food without chemicals."

Dr. Butz described the high cost of chemical research, and he pointed out that "if a company must add to the cost of discovery and development the additional burden and delay of proving complete absence of substances which can induce cancer, even in such small quantities as to be clearly non-toxic, it is small wonder that the current philosophy of law enforcement discourages re-

search and innovation."

Because of scientific advances in agriculture, the U.S. can feed and clothe its entire population with only 11% of its population on farms—a sharp contrast with other nations. This, Dr. Butz asserted, has enabled the nation to employ nine-tenths of its people in other enterprises, which has made possible the fabulous American standard of living.

More FDA Funds?

A different tune is being sung in the halls of the Food and Drug Administration in Washington, however. That agency is asking for a stepped-up budget for 1961 which would bring its spending authority to \$16.9 million, some \$2.7 million over the fiscal year's figure. The added alloca-

tion would permit the hiring of 340 new persons to its regular staff, making a total force of some 2,000. These additional persons would be assigned to the job of testing pesticides.

In hearings before the House Appropriations Subcommittee, made public March 14, George Lerrick, Commissioner of the Food and Drug Administration, said that the problem of pesticide residues in foods is increasing all the time, and that the agency's budget for 1961, starting July 1, 1960, will place particular emphasis on the pesticide problem.

The Commissioner pointed out that with farmers using more and more pesticides in the form of weed killers and insecticides on more crop acres and with additional complex pesticides being placed on the market, the situation needs added attention.

"Almost all of these chemicals are poisonous to humans in some degree," he declared. The agency calculated

that some 212 basic chemicals are currently being used in pesticides compared with only about six in 1940. "Farmers are using 600 million pounds of pesticides each year on practically every food crop grown in the United States," Mr. Lerrick asserted.

Beyond its crusade against pesticides, the FDA is increasing its emphasis on research into "cancer-causing substances" in certain waxes used to coat milk cartons, bread wrappers and other food containers.

North Carolina To Continue Crop Demonstration Plan

RALEIGH, N.C.—A large scale forage crop fertilization demonstration project is being continued for another year in North Carolina. The project was initiated in the fall of 1958 and is under the supervision of Sam H. Dobson and Carl Blake, extension pasture specialists with the North Carolina Agricultural Extension Service.

This project has been and is being supported by an annual grant of \$2,500 from the National Plant Food Institute. It was announced by Samuel L. Tisdale, southeastern regional director.

One of the greatest potential sources for increased agricultural income in North Carolina is in the area of livestock and livestock products. One of the chief bulwarks to more efficient livestock production, however, is the supply of an economical source of feed, particularly roughage. Mr. Dobson believes that much of the feed problem in North Carolina results from inefficient forage crop production caused by improper lime and fertilizer practices. By following practices suggested by the college, livestock farmers in North Carolina can increase their income by literally millions of dollars each year.

The program carried out by Mr. Dobson and Mr. Blake involves the establishment of one to five acre areas of pasture or hay crops on farmers' fields. All practices recommended for establishment and maintenance, including the use of lime and fertilizer in keeping with soil test results, are employed. The areas are identified with an attractive sign in many cases and county agent and farmer tours are conducted periodically.

Areas within each of the demonstrations are caged and the forage is clipped periodically. The ungrazed areas under the cages demonstrate to the observer the amounts of forage that have actually been produced.

In addition, the clippings taken from under the cages are mounted on specially constructed racks and boards which are kept in a prominent place in the county agent's office. The amount of forage produced over the entire growing season along with the rainfall record is demonstrated visually to an even greater number of persons than those viewing the plots. The special demonstration boards and racks are drawing considerable attention and Mr. Dobson and Mr. Blake feel that they have been a very important factor in contributing to the success of the entire demonstration program.

It is anticipated that the project will be continued for several years. Demonstrations are currently underway in 24 counties and Mr. Dobson plans to extend the program into additional counties in future years.

Indonesia to Construct \$43.2 Million Plant

PALEMBANG, INDONESIA—Sriwidjaja Fertilizers, Inc., the Indonesian government's company, will construct a \$43.2 million fertilizer plant here, with the help of a \$33.2 million loan from the U.S. Export-Import Bank of Washington.



Its versatility and superiority help increase your volume and profits

You can recommend Grace Urea Prills for all crops, wherever a nitrogen fertilizer is needed.

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And, of course, your customers can use Grace Urea Prills profitably for:

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- ✓ Foliar application
- ✓ Application in irrigation water
- ✓ Spring fertilization of pastures

You help your customers as well as yourself when you promote the increased use of Grace Urea Prills. They offer your farmers $4\frac{1}{2}$ pounds of nitrogen for each ten pounds applied—the most nitrogen per pound in solid form... guaranteed 45%.

To build up the nitrogen content in liquid fertilizers, use either Agricultural Grade Grace Crystal Urea or Grace Urea Prills. Both dissolve readily, stay dissolved.



BRIGHT OUTLOOK

(Continued from page 1)

coming spring. Its use for upgrading the P_2O_5 content of granulated mixtures, for making liquid fertilizers, and for direct soil application appears to be expanding more rapidly than suppliers can accommodate. Inasmuch as many producers utilize the major proportion of their acid captively for manufacture of concentrated superphosphate or ammonium phosphates, supplies available for shipment to other fertilizer uses are limited.

Some shortage also may develop in supplies of ammonium sulfate in the spring because the 1959 steel strike prevented a buildup of stocks of the byproduct material to the desired level by the year-end. It appears unlikely that output of synthetic ammonium sulfate can be expanded sufficiently to compensate fully for lower supplies from coke ovens, although some increase in imports is to be expected. Exports of ammonium sulfate may be curtailed in order to provide more material for the domestic market.

There will be 59 anhydrous ammonia plants in operation to supply 1960 demand for nitrogenous fertilizers. Total capacity is estimated at approximately 5.1 million tons NH_3 , or 4.2 million tons N. For several months last spring, production of ammonia was 90% or better of the above rate, so there is not much room for increase during the coming season. Although surplus ammonia capacity exists on the Pacific Coast, other areas may feel some pinch during the period of peak demand.

Pesticides

The past year has been a good one for the pesticide industry. Production and exports of DDT, a leading insecticide, are ahead of 1958, both gains being directly attributable to procurement programs of the International Cooperation Administration and the World Health Organization in their malaria eradication campaign.

Copper sulfate exports hit their lowest level in 22 years in 1958, owing to substitution of a petroleum oil to control Sigatoka on fruit plantations in Latin America. They have made a partial comeback, and shipments in 1959 are well above those of the previous year. A strike at three copper sulfate plants (two producers) reduced production of this chemical in the closing months of 1959, but inventories, which were sizable at the beginning of the strike, have so far prevented shortages.

Producers of cotton insecticides had a good year, and output of a number of these products increased over 1958.

According to trade sources, pyrethrum extract had a very good year in 1959. Pyrethrum continued to be used at a high level in home aerosol dispensers because of its property of non-toxicity to humans.

The pesticide industry was just beginning to feel the effects of the steel strike when production was resumed. Shortages of benzene, naphthalene, and steel drums would have had a serious impact, but the situation did not become critical.

The outlook in 1960 is encouraging. During the current fiscal year, ICA expects to procure about 60 million pounds of 75% DDT and 100,000 lb. of 75% dieldrin for use in the malaria eradication program.

Copper sulfate producers are optimistic and feel that they will continue to recover part of the Latin American market. It is believed that a combination of copper sulfate and fungicidal oil will be used in most instances instead of one or the other product.

Producers of cotton insecticides feel that the coming year will be as good as or slightly better than 1959. The U.S. Department of Agriculture has announced that the national acreage allotment for cotton will again

be 16 million, doubtless requiring high production of insecticides.

Pyrethrum processors are anticipating an even better year than in 1959.

Conference Dates Set

BILOXI, MISS.—Dates for the 1960 meeting of the Mississippi Soil Fertility and Plant Food Council have been set for Aug. 25-27, 1960, at the Buena Vista Hotel, Biloxi, Miss., according to an announcement by G. A. Triggs, Jackson, Miss., chairman of the group's publicity committee.

HEART VICTIM

SYRACUSE, N.Y.—Burr N. Johnson, 81, retired manager of the New York State territory of the F. S. Royster Co., suffered a fatal heart attack Feb. 19. He was associated with the Royster company for 25 years until his retirement 20 years ago.

Spencer Names New Distributors for 'Carbyne'

KANSAS CITY, MO.—Distributors in the western United States for "Carbyne," a new wild oat herbicide, have been named by Spencer Chemical Co. The states and distributors are: Montana—Montana Flour Mills, Inc.; Chipman Chemical Co., and AGSCO, Inc.; Colorado and Wyoming—Selco Supply Co.; Idaho, Oregon, and Washington—Miller Products Co. and Chipman Chemical Co.; Utah—Chipman Chemical Co.

In addition to these states, sales in the north-central states will be handled by F. H. Peavey & Co. and AGSCO, as was announced previously.

Sales of "Carbyne" will be made on a limited basis this spring. Approval has been granted by the United States Department of Agriculture for trial use of the new chemical on spring wheat, barley, and sugar beets.

CROPLIFE, March 21, 1960—21

WORKSHOP

(Continued from page 1)

damaging proportions before they were reported.

Entomologists pointed out that most people who work with plants and animals can be trained to watch for suspicious circumstances that may indicate the presence of a new pest. However, suspected materials must be studied by highly trained specialists, known as insect taxonomists, who are the only persons qualified to identify an insect as a new invader. One purpose of the detection schools is to enable field workers to be more discriminating collectors of insects, and thus avoid inundating the comparatively few taxonomists with a flood of common insects of no economic importance.

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Croplife

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Southern states.

Fire Ant Problem Burns Again

IT IS GETTING near the time again when the tussle begins between those who want to continue Federal-State cooperative efforts to eradicate the fire ant from various sections of some Southern States, and those who violently oppose such actions. Probably legislative groups, the U.S. Department of Agriculture and state departments of agriculture will be besieged with petitions, arguments and data to prove or disprove one side or the other.

It should be kept in mind by the pesticide industry and others, that the National Association of State Departments of Agriculture in its annual session recently, passed a resolution on fire ant control favoring "complete eradication" of the pest as soon as possible. This is a powerful voice in favor of the program.

Of significance, also, is the forthright manner in which the group worded and phrased its resolution. There was no note of uncertainty.

Here is the text of the Association's resolution:

"WHEREAS, the imported Fire Ant is now known to be established in parts of eight southern states; and

"WHEREAS, the nuisance value of the pest has seriously hampered the harvesting operations of various farm commodities; and

"WHEREAS, state regulatory agencies and the U.S. Department of Agriculture Plant Pest Control Division have recognized the overall seriousness of this pest and have successfully conducted a cooperative federal-state eradication campaign since 1957 as well as having quarantines to prevent the spread of the pest to other areas; and

"WHEREAS, considerable progress has been made since the inception of the program to contain the pest, eradicate it in the outlying areas, and suppress it in the generally infested areas; the results of which strongly indicate a possibility of eventual eradication of the pest:

"NOW, THEREFORE, BE IT RESOLVED, by the National Association of State Departments of Agriculture assembled in convention at Nashville, Tenn., that its members in the infested states be urged to continue to actively support the cooperative Federal-State Imported Fire Ant Eradication Program in their respective states and bring to the attention of their legislatures the need of funds whereby a more aggressive program can be conducted to bring about complete eradication of the pest at as early a date as possible."

Opponents of agricultural pest control probably have only a hazy idea of how formidable a foe human beings face in the insect world. The human race is outnumbered and outweighed by agricultural pests. The population of the world is on the increase, but the progeny of mere people can never hope to approach the potentialities of insects. The descendants of one female aphid, if all lived, would amount to over one and one-half septillion (1,560,000,000,000,000,000,000) by the end of a single season! At this point numbers are beyond meaning, but translated into other terms, they become more understandable.

Insects have not yet taken over the world, but they keep trying. A natural balance of nature is one factor in keeping bug populations within bounds, but with man's population expanding and his crop-growing pattern as it is, nature's "balance" has somewhat lost its equilibrium and other means must be found to control pests.

It is when conditions are conducive to survival of these billions of insects, that we have them break out in plague force. History is full of stories of famine, pestilence and death caused by uncontrolled insects. The plague of Egypt described in the Bible was one occasion where locusts flew so thick that they "darkened the land and devoured crops so that not a green thing remained."

Man's only hope for control of agricultural pests is through the application of modern "know-

how" . . . but all the knowledge in the world neatly handcuffed and prevented from being used, can't stop the ravages of rampant bugs.

Fertilizer Supply Plentiful

SUPPLIES OF fertilizer materials are currently estimated to be up 5.2% over those of last year, according to a report made by the U.S. Department of Agriculture on the fertilizer situation. Dr. H. H. Shepard and staff from the Food and Materials Requirements Division of the Commodity Stabilization Service, USDA, compiled figures from many sources to come up with a total of 8,085,000 tons of plant nutrients comprising the supply picture for the 1959-60 year.

Dr. Shepard indicates that the tonnage is surprisingly high, but despite this situation, he said that apparent scarcities may develop during the coming season. Such shortages may develop because of "the growing complexity of the industry, the need to provide the variety of materials demanded, and the increasing quantity of fertilizers that must be moved in a short period of time."

The report also listed other factors that could lead to spot shortages. Among these are transportation systems which are of course limited in the quantities of fertilizers that can be moved in one day.

Consider also the plight of the manufacturer who is limited in the quantity of plant food he can manufacture or load on carriers in a short time. Also, from the standpoint of his often not knowing much in advance what the demand will be for a specific product such as anhydrous ammonia, nitrogen solutions, ammonium nitrate, concentrated superphosphate and phosphoric acid. Some orders of these may go unfilled in the height of the busy season. Such a situation is always complicated by duplicate orders placed with a number of producers.

At least part of the responsibility for larger-than-usual supplies on hand can be assumed by the fact that production rates during the first half of the 1959-60 season were above those of the previous year, and it is generally believed that they will continue in such a direction for the remainder of the fiscal year.

"Primary producers were strongly optimistic towards mid-year," Dr. Shepard observed. December production of anhydrous ammonia, fertilizer grade ammonium nitrate, solutions, synthetic ammonium sulfate, nitric acid, urea and wet process phosphoric acid was reported to be the largest of any month in the history of the industry.

As a backdrop for the extra production flurry is the fact that inventories of primary producers (as well as those in other segments of the industry) were depleted last spring when sales exceeded expectations. Thus, the accelerated production last summer was likely for fall sales and rebuilding inventories. Despite this, however, stocks of primary producers at the end of December, were still below those of a year earlier.

Exceptions to this were anhydrous ammonia, nitrogen solutions and normal superphosphate.

Probably the moral of this story is seen in the necessity for dealers to get stocked up on fertilizer supplies as soon as possible to be ready for the main part of the usual spring rush. Such foresight is not merely a favor to the supplier. It is a distinct advantage to the dealer himself so he will not have to sacrifice tonnage later because of a lack of stock on hand.

Despite the plentiful supply of plant food described in the government report, its presence in a distant warehouse will be of small comfort to the seller far off, who is unable to meet the demand for fertilizer materials as fast as the customers want them.



Croplife's Home Office

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop area) basis with a mailing schedule which covers consecutively, one each week, three geographic regions (South, Midwest and West) of the U.S. On the fourth week, production personnel in fertilizer manufacturing and pesticide formulating plants throughout the U.S. are covered in depth. To those not eligible for this controlled distribution, Croplife's subscription rate is \$5 for one year (\$8 a year outside the U.S.). Single copy price 50¢.

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EXECUTIVE AND EDITORIAL OFFICES — 2501 Wayzata Blvd., Minneapolis, Minn. Tel. Franklin 4-5200. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D.C. (WA 82).

Published by
THE MILLER PUBLISHING CO.
2501 Wayzata Blvd., Minneapolis, Minn.
(Address Mail to P. O. Box 67, Minneapolis 40, Minn.)



Associated Publications — The Northwestern Miller, The American Baker, Farm Store Merchandising, Feedstuffs, Milling Production, Feedlot, Professional Nursing Home

MEETING MEMOS



MEMOS



June 9-11—Manufacturing Chemists' Assn., 58th annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

July 11-13—North Central Agronomy Society, Summer meeting, University of Minnesota Farm Campus, St. Paul, Minn.

Aug. 2-3—Ohio Pesticide Institute, Ohio Agricultural Experiment Station, Wooster, Ohio.

Aug. 21-25—Canadian Fertilizers Assn., annual convention, Manoir Richelieu Hotel, Murray Bay, Quebec, Canada. H. H. Skelton, P.O. Box 147, Hochelaga Station, Montreal, Que., Canada, general chairman.

Sept. 24-26—Western Agricultural Chemicals Assn., 31st annual meeting, Palm Springs Riviera Hotel, Palm Springs, Cal.

Sept. 27-29—National Agricultural Chemicals Assn., 1960 meeting, del Coronado Hotel, Coronado, Cal.

Meeting Memos listed above are being listed in this department this week for the first time.

March 8-25—Ohio dealer short courses: Tuscarawas County, New Philadelphia Public Library, March 8; Ohio Power Co. office, New Philadelphia, March 15; Public Library, New Philadelphia, March 22; Coshocton County, Electric Corp. Building, Coshocton, March 9, 16, 23; Licking County, Extension Office, Newark, March 9, 10, 11, 18, 24; Hocking County, Extension Office, Court House, March 11, 18, 25; Muskingum County, First National Bank Auditorium, Zanesville, March 10, 17, 24.

March 22-23—Western Agricultural Chemicals Assn., spring meeting, Miramar Hotel, Santa Barbara, Cal.

March 23-25—North Central Branch, Entomological Society of America, Schroeder Hotel, Milwaukee, Wis.

March 30-31—Twenty-fourth annual meeting, Georgia Entomological Society, New Science Center, University of Georgia, Athens, Ga.

April 11-12—Eighth annual California Fertilizer Assn. Conference, sponsored by CFA Soil Improvement Committee, Fresno State College, Fresno, Cal.

June 12-15—National Plant Food Institute annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 13-16—Western Society of Soil Science meeting, University of Oregon, Eugene, Oregon.

June 21-22—Eighteenth Annual Convention, Association of Southern Feed & Fertilizer Control Officials, Riverside Hotel, Gatlinburg, Tenn. For further information, write Maurice B. Rowe, secretary-treasurer, Department of Agriculture, 1119 State Office Building, Richmond 19, Va.

June 27-29—Northwest Section, American Society of Range Management summer meeting, John Day, Oregon.

June 27-29—Pacific Branch, Entomological Society of America, Davenport Hotel, Spokane, Wash.

July 13-15—Eleventh Annual Fertilizer Conference of the Pacific Northwest, Hotel Utah, Salt Lake City; B. R. Bertramson, State College of Washington, Pullman, Wash., chairman.

July 27-29—Great Plains Agricultural Council, 1960 meeting, Laramie, Wyo.

July 27-30—Southwest Fertilizer Conference and Grade Hearing, Galveston Hotel, Galveston, Texas.

Aug. 15-23—Seventh International Soil Science Congress, University of Wisconsin, Madison, Wis., Prof. Emil Truog, Congress Manager, Soils Building, College of Agriculture, Madison 6, Wis.

Aug. 25-27—Mississippi Soil Fertility and Plant Food Council, 1960 meeting, Buena Vista Hotel, Biloxi, Miss.

Sept. 27-29—Annual meeting of National Agricultural Chemicals Assn. for 1960, Hotel del Coronado, Coronado, Cal.

Sept. 29-30—Northeast Fertilizer Conference, Hotel Hershey, Hershey, Pa.

Oct. 5-6—Southeast Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 17-21—48th annual National Safety Congress, Fertilizer Section, LaSalle Hotel, Chicago.

Nov. 13-15—California Fertilizer Assn., 37th annual meeting, del Coronado Hotel, Coronado, Cal.

CALENDAR FOR 1959-60

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(Discussing promising new insecticide compounds at Hercules' Agricultural Chemicals Laboratory are: George Buntin, discoverer of toxaphene; Dr. E. N. Woodbury, laboratory supervisor; Dr. Keith D. Ihde, research entomologist; Dr. Arthur D. Lohr, supervisor, Naval Stores research; and Dr. William R. Diveley, a discoverer of Delnav.)

Hercules Research:

KEY TO TOXAPHENE'S OUTSTANDING RECORD OF SERVICE

Toxaphene has had a remarkable history. In a fast-moving industry this versatile insecticide maintains its leadership after more than 12 years of service to agriculture. New uses are being found for toxaphene each year as it continues its dynamic growth.

Continuous research is carried on by Hercules Powder Company to find new chemicals for agriculture, and to find better ways to utilize the tools

now available. Many of the people doing this work were engaged in the original development of toxaphene. Besides laboratory research, Hercules has placed great emphasis upon field testing and large-scale demonstrations. From such applied research in cotton insect control, for example, has come information to help farmers get better yields while lowering their production costs.

TOXAPHENE

Agricultural Chemicals Division, Naval Stores Department
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INCORPORATED
Wilmington, Delaware



